# DRAFT
# WORKBOOK FOR THE DEVELOPMENT OF CULTURAL RESOURCE MANAGEMENT PROTOCOLS FOR FUELS MANAGEMENT PROJECTS

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# 1.0 INTRODUCTION

## 1.1 BACKGROUND

The *Federal Wildland Fire Management Policy of 1995* (Federal Fire Policy) mandates the development of Fire Management Plans for every federal agency unit within agencies of the Departments of Agriculture and Interior (Agencies) with burnable vegetation. At the same time, the Agencies must meet a variety of statutory responsibilities, including Section 106 of the National Historic Preservation Act. Cultural resources activities (e.g., inventory, evaluation, treatment, consultation) for specific fire management activities such as prescribed fires or mechanical reduction are necessary to meet the regulatory requirements for Section 106 found at 36 CFR § 800. However, the standard Section 106 process is not well suited to the circumstances of fire management. In order to meet the goals of the Federal Fire Policy and Section 106 responsibilities, the Agencies have developed a *Programmatic Agreement on the Treatment of Historic Properties That May Be Affected by Fire Management Activities In Accordance With The Federal Wildland Fire Management Policy of 1995* (Fire PA). The Fire PA calls for the development of Cultural Resource Elements (CREs) of Fire Management Plans that describe the manner in which Agencies will identify and manage cultural resources in planning and implementing fire programs, including fuels management. The Fire PA also allows the development of interim protocols for specific fire management activities, such as fuels management, until acceptable CREs are developed.

This *Workbook for the Management of Cultural Resources Related to Fuels Management Projects* offers procedures for considering cultural resources that may be affected by fuels management activities. It is intended to assist Agencies in developing CREs and interim protocols for fuels management projects pursuant to the Fire PA.

## 1.2 HOW TO USE THIS WORKBOOK

This workbook can be used as a kind of "cookbook" for the development of protocols to manage cultural resources during fuels management projects. It provides sample text and examples of alternative approaches. Agency Units that wish to use this workbook to develop a CRE section or interim protocol for fuels management under the terms of the Fire PA may either choose the approach they prefer or modify, append, or replace text in this workbook.

*Boxed text such as this accompanies many of the following discussions. Such text identifies salient elements that should be included or addressed in the CRE or interim protocol.*

## 2.0 PRESCRIBED FIRE

### 2.1 SOME THOUGHTS REGARDING PRESCRIBED FIRE

In the absence of fire suppression, many fire-adapted landscapes burn on average every several years. Consequently, past wildland and human-caused fires have repeatedly burned over most pre-European archaeological resources. When developing strategies for cultural resource management related to prescribed fire, one should consider the nature and frequency of past fires and their likely effects. If specific fire histories are not available for a location under consideration, regional patterns can usually be reconstructed and the likely history of a given location can be surmised.

Fire behavior is relatively well understood, and our knowledge of thermal effects to specific materials, while imperfect, grows daily. We know, for instance, that soils and deposits deeper than 10-15 cm usually remain relatively cool during severe surface fires that exceed 1,000 °C . Thermal effects to cultural resources buried at or below these depths are likely to be negligible to nonexistent, although secondary effects such as erosion may affect buried resources. Such knowledge can greatly lessen the concern over prescribed fire effects to buried archaeological resources and it can influence the nature of management measures. The U.S.D.A. Forest Service has recently published a volume that reviews the state of knowledge of the effects of fire on cultural resources titled *Wildland Fire in Ecosystems: Effects of Fire on Cultural Resources and Archeology. U.S.D.A. Forest Service Rocky Mountain Research Station General Technical Report (RMRS-GTR No. 42 Vol. 3, Fort Collins, Colorado*.

Some of the procedures described in this document are based on the assumption that low-to-moderate-intensity prescribed fires (excluding ground-disturbing fire control activities) generally have few additional and substantial impacts to non-flammable cultural resources. This does not mean that the application of fire to the landscape is without risk of damage. Some physical alteration of surface and near-surface archaeological materials may result from the reintroduction of fire (e.g., alteration of obsidian hydration rinds, sooting, spalling). In general, historic resources and late prehistoric cultural resources are at greatest risk because they have had less time to be exposed to fire, and historic resources are often made of combustible materials. Iin addition, visibility of the ground surface may be increased by fire, resulting in greater exposure of cultural resources to illegal artifact collection and vandalism.

In balance, however, prescribed fire reduces the potential for damage resulting from uncontrolled wildland fires fed by unmanaged fuels. The procedures described herein are intended to ensure that damage to cultural resources from prescribed fire activities is minimized.

## 2.2 PROFESSIONAL QUALIFICATIONS

The effects of fire on cultural resources are dependent upon the nature of the cultural resources and the thermal environment within which those cultural resources reside. No single formula for protection will apply to all cultural resources. Cultural Resources Specialists (CRSs) at the Agency Unit level are most familiar with the nature of the cultural resources and local environments within their jurisdictions. Central responsibility for decisions regarding the protection and management of cultural resources rests with Agency CRSs that meet the "Secretary of Interior's Workbooks for Historic Preservation Projects, Professional Qualifications Standards" (Federal Register 1983, Vol. 48, No. 190. 44738-39).

CRSs that play an active field role in managing cultural resources during fire management activities such as fire suppression or fuels management projects should also possess a valid "red card" that allows them to serve as technical specialists during wildland fires, monitors during proscribed fires, and to conduct fire experiments.

> *Cultural resource management protocols for prescribed fire projects should state the professional qualifications of Cultural Resource Specialists necessary to conduct historic preservation activities under the terms of the Fire PA.*

## 2.3 PLANNING

### 2.3.1 Planning Schedule

Depending on the size and complexity of a proposed prescribed fire, a minimum of 6-12 months of lead-time is desirable to conduct cultural resources studies. Prescribed fires involving large areas (e.g., more than 1000 acres) should be planned one year or more in advance to allow the CRS to assess existing information, consult with Native American tribes and interested persons, arrange personnel, develop inventory strategies, consider opportunities for controlled experiments, and schedule any necessary fieldwork. Sufficient time also should be afforded to complete these procedures prior to and during the development of NEPA documents. Fire management planning for most Agency Units includes schedules for prescribed fires over several years, whether specified in Fire Management Plans, Five Year Burn Plans, or some other long-range planning document. Agency fire planning processes should provide the CRS with sufficient advanced notice of the Agency's intentions and the need to initiate the cultural resource management planning process.

Some prescribed fires may be considered categorical exclusions that do not require extensive NEPA documentation and public review. However, categorical exclusion under NEPA does not eliminate Agencies' responsibilities under Section 106 of the NHPA. Therefore, the procedures described in the Fire PA or 36 CFR 800 must be followed for prescribed fires regardless of classification of the undertaking under NEPA.

Large prescribed fire projects are complex, involving large areas of land that, in some instances, may contain high densities and high diversity of cultural resources. Prescribed fires can also involve a variety of different land- and resource-disturbing impacts that include the effects of combustion, heat and smoke, control and suppression, access (e.g., roads), and staging (camps and parking areas). With the growing crisis in fuels buildup nationwide, fuels management programs must be implemented rapidly, affording a relatively short lead- time for planning. Consequently, notifying the CRS early in the short planning process is critical.

### 2.3.2 Undertaking Information

Fuels Management Specialists responsible for planning and implementing prescribed fires (Fuels Specialists) should, as soon as a prescribed fire is proposed and with as much lead time as possible, notify the Agency Unit's CRS (e.g., Forest, District, Park or Refuge Archaeologist) of the proposed undertaking. The information supplied by the Fuels Management Specialist will be used by the CRS to define the Area of Potential Effects (APE) for the undertaking, within which subsequent cultural resources identification and management will take place. Fuels Specialists should provide the CRS with information regarding the proposed fire, accompanied by a USGS 7.5 minute topographic quadrangle. This information should include variations in the anticipated intensity of the burn, fire lines, escape routes, and other locations of possible ground disturbance. In establishing an APE, the CRS should be aware of the potential for prescribed fire to expand beyond its planned boundary. The CRS should, in consultation with fuels managers, take a critical look at the nature of fuels surrounding the APE to ensure that inventory includes all areas at moderate risk of ignition are examined. A knowledge of fuel conditions will also help the CRS to determine whether cultural resources (or what types) will be visible and discoverable prior to a prescribed fire. The CRS should be included in planning for prescribed fires well before burn plans are developed, because cultural resource management prescriptions should be included in burn plans.

Protocol documents that describe the flow of information between fire managers and CRSs will demonstrate to the SHPO/THPO that the Agency be well organized and able to communicate effectively, ensuring adequate planning.

*The prescribed fire protocol should describe the types of information that will be conveyed to the CRS, and the sequence or scheduling of cultural resource studies within the planning process. Such information should include a USGS 7.5 minute topographic quadrangle depicting:*

- *the boundaries of the area(s) proposed for burning;*
- *projected variation in planned burn intensities within the fire area;*
- *areas of proposed or potential ground disturbance (e.g., unpaved access roads, fire breaks, fire camps if any) accompanied by a description of how those facilities will be created (e.g., heavy equipment, hand-clearing).*

## 2.4 CULTURAL RESOURCES IDENTIFICATION

### 2.4.1 Assessing Information Needs

The CRS should conduct sufficient background research to determine the kinds of resources known or suspected to exist within the proposed fire area(s). The following steps should be taken to assess information needs:

**Conduct a Records and Literature Search.** Existing information is likely to provide a good indication of the nature of cultural resources that are likely to exist within the prescribed fire area. A variety of information sources may be available for an area proposed for prescribed fire, although not all sources of information may be necessary for decision-making on each and every fire.

The records and literature search is likely to be an iterative process at its most basic level, involving an examination of many of the same references for most projects. The protocol document should identify these as routine information sources. There will also be instances where specific and unusual sources of information may be consulted. Such sources are often unique and may not be anticipated prior to assessing information needs. Examples of such sources of information include persons with special knowledge of an area, diaries, or local records. While the specific sources may be difficult to predict, the research process and the types of information that may be consulted could be identified in the prescribed fire protocol document.

*The CRE or protocol for prescribed fire should identify the sources of pre-field information that will be routinely examined. The protocol should, when possible, identify the circumstances under which more expansive records and literature searches will be undertaken, and the possible types of information that may be sought. Pre-fire research may include some combination of the following:*

- *examination of cultural resource base maps and inventory files to compile a list of known resources and resource types that can be expected within the fire area;*
- *review of historic context documents, such as historical and prehistoric overviews, syntheses, books, or monographs relevant to the study area;*
- *examination of records of land use history (e.g., mining claims, homestead claims, stand record cards, grazing histories, historical accounts);*
- *agency fire records;*
- *paleoenvironmental studies (e.g. dendro-chronological records, soil studies);*

Various information sources should be integrated for convenience and ease of use when possible. Geographic information system integration of cultural and natural resource data can be particularly effective.

**Sample or Reconnaissance Survey to Assess Information Needs.** If little or nothing is known about the proposed fire area, it may be appropriate to conduct a reconnaissance or sample survey. The purpose of sample or reconnaissance surveys is to determine the nature of cultural resources that occur within the prescribed fire area. Such information may be necessary to determine the type and extent of further survey (if any) that is needed in order to identify cultural resources that you are interested in identifying. A sample survey may reveal an area to be highly sensitive for certain resource types, yet the existence or condition of such properties needs to verified before an intensive survey is warranted. For example, a literature search may indicate the potential for historic homesteads in a region, yet the CRS suspects little potential for standing structures, given fire history and general preservation conditions. A reconnaissance survey might be conducted to determine whether historic structures or structural remains

survive in the proposed prescribed fire area.

Sample of reconnaissance survey may be advantageous for more than cultural resource identification purposes; sample survey might be used to assess the nature, loading, and distribution of fuels. Natural resource managers and others may find such information advantageous and will support a survey or reconnaissance effort that supplies such information.

> *If an Agency Unit wants to reserve reconnaissance or sample surveys as an option in determining further identification needs, then the protocol should identify the criteria under which reconnaissance or sample surveys will be conducted, and how resulting information will be used to make decisions regarding the need for additional field inventory.*

**Consultation with Indian Tribes and the Public.** Indian tribes should be consulted when preparing a CRE or protocol document. The objective of this consultation, particularly for Agency Units managing large land areas, may be to establish how future consultation will be approached for specific prescribed fire undertakings.

Consultation for specific prescribed fire projects will depend on a variety of circumstances that vary greatly between Agencies. The substantial differences in agency sizes and missions, environments, and Native American and public concerns are likely to result in widely different concerns and recommended consultation procedures between Agencies and Agency Units. Some Agency Units may have as little as a few to several hundred acres to manage (e.g., battlefields), and the full range of Native American concerns might be identified in single consultation. Other Agency Units cover millions of acres that could contain thousands of cultural resources important to Native American people and the interested public. Under such circumstances a single consultation will not identify concerns for all specific undertakings. In light of such diversity, no single set of consultation procedures will meet the needs of all Agencies. Consultation may occur: for five-year burn plans; for all of the proposed prescribed fires for a season; or for each individual burn. The timing and frequency of consultation should be established when consulting on the development of the CRE or interim protocol.

Agencies should be aware that some cultural resources, such as sacred sites or traditional plant collection areas, may not have obvious archaeological signatures. The only means of identifying such resources is through consultation with the people that attach importance to them. The use of prescribed fires for resource benefits also may extend to cultural resources. Agencies should be receptive to opportunities to enhance certain environments or resources used by Native

Americans, if coordinated to ensure proper timing and intensity. For example, the Six Rivers National Forest in northern California, has conducted a prescribed fires for nearly a decade in order to enhance the productivity and quality of bear grass and hazel, plants important in Native American basketry manufacture. Early consultation identifies such opportunities and also provides an indication of the levels of interest and concern about the proposed prescribed fire and the likely extent of further consultation that may be necessary prior to the prescribed fire.

***Example***

The *Programmatic Agreement Among USDA Forest Service, Southwestern Region and Arizona State Historic Preservation Officer and New Mexico State Historic Preservation Officer and Advisory Council on Historic Preservation Regarding Wildland Urban Interface Hazardous Fuels Reduction Projects* (Southwestern Region USFS PA) identifies the need for consultation with Indian tribes, although the specific timing and circumstances are left to each Forest according to their individual procedures. The specific language from the Southwestern Region USFS PA is presented below.

> 3. TRIBAL CONSULTATION. As early as possible in the planning process, but no later than the identification stage, the FS shall consult with American Indian tribes to determine if any properties of traditional cultural or religious importance are present within the WUI project's area of potential effect. If specific properties are identified, the FS shall consult with the appropriate tribes concerning evaluation, determination of effects, and protection measures. If agreement cannot be reached or if adverse effects cannot be avoided, the FS shall consult case-by-case with interested tribe(s) and the SHPO as provided for in Stipulation 13.
>
> 4. PUBLIC INVOLVEMENT. The FS shall use the NEPA scoping process and other means necessary to solicit input on heritage resource concerns and to identify consulting parties as required in 36 CFR 800.3(f). (Southwestern Region USFS PA, Stipulations 3 and 4)..

*Prescribe fire protocols should identify the results of Native American consultation regarding the protocols themselves. The protocol should also specify how and when consultation will occur in light of the Agency's fire management program and planning process, when assessing information needs. Identify the Indian tribes appropriate to the Agency and how consultation will proceed, with respect to government to government relations*

**Consultation with the SHPO/THPO.** Agency Units must determine the appropriate State Historic Preservation Officer (SHPO) with jurisdiction in the APE and/or Tribal Historic Preservation Officer (THPO) for the Indian tribe that has assumed SHPO responsibilities under Section 101(d)(2) of the NHPA, or Indian tribe when the undertaking occurs on tribal lands. In preparing a protocol, the Agency Unit will negotiate with the SHPO/THPO regarding the nature and frequency of consultation. One purpose of the CRE or prescribed fire protocol is to provide regulatory streamlining. Therefore, the Agency Unit should consider opportunities to eliminate or reduce review steps where such streamlining does not compromise the adequate consideration of cultural resources. Whether or not an Agency should consult with the SHPO/THPO in assessing information needs should depend on the nature of the undertaking and potential sensitivity of cultural resource issues that may arise. In the absence of controversy or particular problems, most Agencies should be able to forego consultation with the SHPO/THPO when assessing information needs for specific prescribed fire undertakings. However, the SHPO/THPO must agree to the consultation schedule.

### 2.4.2 Identifying Cultural Resources

Two general approaches to inventory are described below: (1) intensive inventory; and (2) selective inventory (defined below). Agencies may choose or develop the methods that are best suited to the individual circumstances of the Agency or the project. If the Agency does not want to be limited to a single inventory method in developing the fuels management section of the CRE or interim protocol, then the Agency should describe the decision-making or review process that will be followed in determining the inventory strategy. For example, an Agency might specify that it intends to conduct 100% intensive survey for prescribed fire projects, and will consult with the SHPO/THPO only in circumstances where it proposes an alternative strategy. Such decision-making rules can be more complex, and may even define specific conditions under which specific inventory methods will be applied and under which SHPO/THPO consultation will occur.

**Intensive Field Inventory.** For the purpose of this discussion, intensive survey means the survey strategy (e.g., transect spacing, exposure methods) most commonly accepted by the agency to find all resources that could be determined important (e.g., National Register eligible). Such criteria vary between agencies. An Agency may choose to conduct an intensive field inventory of entire proposed fuels management areas according to agency standards and using qualified Cultural Resource Specialists that meet the Secretary of Interior's Workbooks for Historic Preservation Projects, Professional Qualifications Standards (Federal Register 1983, Vol. 48, No. 190. 44738-39.

In most circumstances, previously unsurveyed areas of proposed ground disturbance should be intensively surveyed (e.g., fire lines, new access roads, helispots, and fire camps if any). Existing

fire lines need not be surveyed where rehabilitation of the fire line is accomplished by clearing duff with garden rakes and removing overhanging branches by hand.

The purpose of prescribed fire is usually to reduce fuel loads on and near the ground surface. Consequently, ground visibility is likely to be obscured where prescribed fire is proposed and needed. Intensive survey is often thought of in terms of close transect spacing and visual examination of the ground surface. Such methods may be inadequate to identify all, or even most, cultural resources that could be important. In some instances, it may be appropriate or necessary to employ search methods that "see through" obscuring vegetation such as metal detectors, shovel probes or other subsurface exploratory excavation, ground-penetrating radar, etc. Obviously, such methods would be prohibitively expensive and impractical for extensive areas, but they may be appropriate where potentially important cultural resources are strongly suspected. In short, methods that are considered "intensive" should be determined by what the agency wants to find. This determination should be made in consultation with the SHPO/THPO, and may involve the consideration of variables such as vegetation cover, slope, and resource sensitivity.

If Agencies perform literature research and choose to conduct intensive survey using qualified professionals, then SHPOs/THPOs should be confident that the Agencies are making good faith efforts to identify historic properties. The payoff to this approach should be an elimination of initial SHPO/THPO consultation under most circumstances.

> *When intensive, 100% field inventory is proposed according to contemporary professional standards, Agencies should consider explicitly eliminating or limiting prefield SHPO/THPO consultation in the prescribe fire protocol documents.*

Once an intensive field inventory is completed, the CRS should determine whether identified cultural resources are likely to be affected by the fuels management activity. If resources are not present or unlikely to be affected by the prescribed fire or any associated activities, then the Agency should be able to reduce or eliminate further SHPO/THPO consultation. This may require specifying or defining what the Agency means by "no effect."

***Example***

An example of categorically defining the circumstances under which the Agency will consider cultural resources to be unaffected is found in the *Programmatic Agreement Among Wrangell-St. Elias National Park and Preserve,*

*Yukon-Charley Rivers National Preserve, Gates of the Arctic National Park and Preserve, the Advisory Council on Historic Preservation, and the Alaska State Historic Preservation Officer Regarding Implementation of the Fire Management Plan and Section 106 Compliance* (Alaska NPS PA). That agreement eliminates from inventory and further consideration both subsurface cultural resources and those made of non-combustible materials. The specific language from the Alaska NPS PA used to exempt subsurface and noncombustible resources is listed below.

> Archaeological sites consisting solely of subsurface remains are not subject to further review under this Agreement based on the fact that they have a low potential to be adversely affected by wildland fires, and because most have presumably experienced burn over by wildland fires sometime in the past. Similarly, sites that are constructed of or consist solely of noncombustible materials, such as stone or iron, are also not subject to further review (Alaska NPS PA: Stipulation II).

Whether or not one agrees that subsurface remains are patently immune to the effects of wildland fire (they are not), agreement can be reached on the type and extent of inventory that will be considered adequate. The agency and SHPO/THPO may be aware of the possibility that there could be adverse effects to some historic properties, yet be willing to accept such effects given the impracticality of finding such resources and the overall benefit of prescribed fire.

Under the terms of the Fire PA, if the SHPO/THPO agrees with these protocols, then no further consultation would be necessary when such circumstances pertained for all individual prescribed fire projects. If cultural resources could be substantially damaged by the prescribed fire, the CRS should consider whether the resources can be protected with standard protection measures. If identified cultural resources will be protected or avoided, no further SHPO/THPO consultation is necessary.

*If no cultural resources are present, or cultural resources will not be affected, then further SHPO/THPO consultation should be reduced if not eliminated and no further historic preservation activities should be necessary.*

**Selective Inventory.** Selective survey is defined as a strategy that is designed to identify either a sample of cultural resources or certain kinds of cultural resources. An agency may choose to conduct less than a complete and intensive inventory if it determines that a selective inventory

will ensure the adequate consideration of historic properties. Different selective inventory approaches may be adopted or developed, including: (1) project-specific strategy development and SHPO/THPO notification; (2) sample and reconnaissance survey; and (3) inventory for specific classes of cultural resources or "resources-at-risk."

***(1) The SHPO/THPO Notification Approach.*** One approach to selective inventory is project-specific notification of the SHPO/THPO if less than 100% field survey is proposed. This approach allows agencies to reduce or eliminate SHPO consultation time under circumstances of intensive survey, but still affords the option of less than intensive survey. Even when consultation is specified, that time can still be reduced by agreement with the SHPO/THPO. For example, protocol language might be crafted to "notify" the SHPO/THPO and afford them a brief period for response. This reduces standard consultation periods (e.g., 30 days) and allows the SHPO to agree with the proposed strategy by simply not commenting or responding to the notice.

> ***Example***
>
> The Southwestern Region USFS PA specifies that the SHPO will be notified if that Agency proposes less than 100% survey. The SHPO notification provides a description of the proposed survey strategy and its rationale. The SHPO is afforded 10 days to respond to the notice. The PA also specifies that each Forest may develop its own survey standards in consultation with the SHPO to eliminate the need for individual project notifications. The PA explicitly recognizes that, as experience is gained in implementing the PA, the goal is to develop a Region–wide set of survey workbooks which can be used in lieu of case-by-case SHPO notification and review.

The identification section of the Southwestern Region USFS PA is offered in Attachment 2 of this workbook.

***(2) The Sample Survey Approach.*** Another approach to selective inventory is to conduct a sample or a reconnaissance survey of the area of potential effects (APE). This strategy can be used to determine whether an additional survey is needed, or it can simply be used to determine the nature of cultural resources within a prescribed fire area, without further pre-burn inventory. The latter circumstance may provide information for monitoring the effects of fire on cultural resources to test assumptions regarding the nature of such effects.

It is important to consider the time and complexity of developing effective sample survey protocols. Are the criteria complex? Who will be using the strategy and are they capable of easily understanding and implementing it? How much time and effort is involved in developing or implementing the sampling strategy? Time spent developing and consulting

about a strategy should be weighed against the consultation time that is saved if the Agency simply conducts an intensive survey, subtracted from the possible increased time it may take to do an intensive survey.

***Example***

The *Programmatic Agreement Among the Advisory Council on Historic Preservation, the Colorado, Wyoming, South Dakota, Nebraska, and Kansas State Historic Preservation Offices, and the U.S.D.A. Forest Service, Rocky Mountain Region Regarding the Implementation of the Prescribed Fire Program* (Rocky Mountain USFS PA) offers this approach. The prescribed fire program in that region encompasses two general project planning processes: individual, stand alone prescribed burn projects; and prescribed burning as a tool for meeting management objectives in a large scale analysis area such as that for a timber sale, landscape or watershed. Cultural resource identification procedures are specified for each approach.

For stand-alone *prescribed* fire projects, Forests follow specific protocols that involve intensive survey of all fireline locations, and reconnaissance survey transects to look for wood features, exposed archaeological features, and rock art panels which could be effected by the prescribed fire in open grass and sagebrush settings.

For forested *settings*, the Rocky Mountain PA specifies intensive survey where specific environmental conditions exist (e.g., slope and proximity to water, geomorphological features), as well as an unspecified sample survey of acres outside these areas. Finally, the Rocky Mountain PA calls for intensive survey of all areas where long duration, moderate and/or high level of fire severity is anticipated.

For projects where prescribed burning is proposed as a tool for meeting management objectives in a large scale analysis area, the Rocky Mountain PA specifies a literature search of existing information and consultation with Indian tribes, the SHPO, and public to identify all known cultural resources in the analysis area. The Forest will use this information as a basis for determining potential effects of the prescribed burn(s) on historic properties within the NEPA process. The Finding of No Significant Impact (FONSI) or Record of Decision (ROD) contains specific language requiring the Forest to inventory for and assess effects to historic properties by a prescribed fire once a specific burn plan has been developed. Once a specific burn plan is developed, project areas with anticipated short

duration, low and/or moderate level of fire severity are subjected to a sample survey, while project areas or burn units which are anticipated to have a long duration, moderate, and/or high level of fire severity are subjected to intensive surveys.

Portions of the Rocky Mountain PA relating to cultural resources identification are offered in Attachment 2.

***(3) The Cultural Resources-at-Risk Approach***. The term "resources-at-risk", refers to classes of resources that: (1) have some potential to be important (e.g., eligible for the National Register of Historic Places); and (2) the important characteristics of the class of resources have a reasonable potential to be substantially damaged or destroyed by the nature of the fire activity that is proposed. Professional judgment can play an important role in identifying cultural resources-at-risk, particularly when the effects of fire on certain types of archaeological materials are poorly understood.

The resources-at-risk concept is not new, and has taken other forms in regional programmatic agreements.

***Example 1***

Following is the approach taken toward the identification of fire-sensitive site types in the Southwestern Region USFS PA:

**APPENDIX B**

**LIST OF FIRE-SENSITIVE SITES**

A review of available literature on the effects on fire on cultural resources and on the experience of FS heritage resource specialists and SHPO staff in the Southwestern Region indicates that there are two categories of fire-sensitive sites. The first consists of sites long-known to be vulnerable to the effects of even low-temperature fires and/or light fuel loads, such as sites that contain organic materials, exposed architecture, etc. The second group includes sites that have generally been considered to have less risk for fire effects in most situations, including prehistoric and historic sites with deeply buried cultural deposits; prehistoric and historic artifact scatters; and prehistoric and historic sites with non-flammable surface features. However, depending on field conditions—especially fuel loading—as well as specific site characteristics and expected fire behavior, these other site types may be fire-sensitive in certain WUI projects.

**Known Fire-Sensitive Sites in the Southwestern Region:**

- Historic sites with standing, or down wooden structures or other flammable features or artifacts
- Rock art sites
- Cliff dwellings
- Prehistoric sites with flammable architectural elements and other flammable features or artifacts
- Prehistoric sites with exposed building stone of soft or porous material such as volcanic tuff
- Culturally modified trees, including aspen art and peeled/scarred trees
- Certain traditional cultural properties (based on consultation with tribes)

**Other Project-Specific Fire-Sensitive Sites:**

- Other sites, based on local field conditions and Forest-specific concerns
- Other sites, based on consultation with SHPO staff
- Other sites, based on consultation with fire management staff, fire behavior specialists or fire effects researchers

Forest Archaeologists will use site assessment and monitoring data, and will consult with fire management staff, to identify known and other project-specific fire-sensitive sites for individual Forests or project areas. Fire-sensitive sites officially determined ineligible for the National Register of Historic Places do not require protection under Section 106.

*Example 2*

The Rocky Mountain PA lists high and low risk historic properties based on a literature review, as follows:

**APPENDIX D**

**LIST OF HIGH AND LOW RISK HISTORIC PROPERTIES**

Three basic threats to historic properties were considered as part of the development of the list given below:

1. Threats from fire itself, or fire intensity;
2. Threats from fire control activities such as bulldozer lines, hand lines, retardant drops and staging areas;
3. Threats from post-fire erosion control or rehabilitation activities.

The list of high and low risk properties that may be affected by fire directly was developed through a review of available literature on the subject of fire effects on cultural resources. The primary sources for this review

included *The Effects of Fire on Cultural Resources: A Survey of Literature Pertaining to Fire Control and Management* by William Kight, dated 1994 and *The Effects of Fire on Cultural Resources* by Hal Keesling, dated 1993. This list is not intended to be all-inclusive and may be amended as additional information becomes available.

**High Risk**:
Historic sites with standing, or down wooden structures or other flammable features.
Rock image sites.
Prehistoric sites with flammable architectural elements and other flammable features.
Prehistoric artifact scatters located in potentially unstable geomorphological settings.
Historic and prehistoric sites with the potential for hearths and datable charcoal or other fire sensitive deposits.
Prehistoric and historic cemeteries.
Peeled, or scarred pine tree sites.
Aspen art sites.

Traditional Cultural Properties (based on consultation with tribes)
Rockshelter Sites
Cultural Landscapes

**Low Risk:**
Prehistoric and historic sites with deeply buried cultural deposits.
Prehistoric and historic artifact scatters in stable settings.
Prehistoric and historic sites with non-flammable surface features.
Historic earthworks.
Sites officially determined ineligible for listing in the NRHP.

The primary difference in applications between "fire-sensitive", "high and low risk", and "resources-at-risk" is the manner in which Agencies choose to use the concept. The concept of resources-at-risk can be used both for identification and management. Some Agencies do not make a distinction between resources-at-risk and non-threatened resources during the inventory phase of studies. Instead, they make an effort to identify all cultural resources and use fire sensitivity as a criterion by which to determine appropriate management. Other agencies use the resources-at-risk approach to structure the identification effort itself. Finding resources-at-risk is the objective of the survey effort. Use of this concept to direct management is discussed later in this workbook.

A variation of this "resource at risk" concept is also used in the Alaska NPS PA, which eliminates from inventory and further consideration both subsurface cultural resources and those made of non-combustible materials. After excluding all cultural resources that fall into these categories, the Alaska NPS PA calls for the inventory of cultural resources within the area

of potential effect (APE) within each park unit. This usually involves conducting a records search and surveying for known selected resource types (primarily above-ground structures). Protocol documents can take either of two different approaches to the determination of resources-at-risk (a.k.a. "fire-sensitive sites" or "high risk historic properties"). An *a priori* list of such resources can be compiled, such as those in the Southwest and Rocky Mountain PAs. CRSs will always look for and record such resources during the inventory effort. Alternatively, resources-at-risk can be compiled on a project-specific basis, depending on the nature of a prescribed fire. The types of resources-at-risk may vary according to the specific activity or aspect of the project. For example, a resource type such as a subsurface archaeological deposit that is at risk from fire line construction with a bulldozer may be unaffected by simply being burned over. In this example, the very same resource type is at risk in one circumstance, but not in the other. Resources-at-risk within prescribed fire areas will probably always include historic, above-ground wooden features (e.g., cabins, corrals, fences, flumes, trestles, historic power poles, logging chutes, bow stave trees). Specific resources or classes of resources may also be considered resources-at-risk if there is a reasonable potential for indirect effects resulting from prescribed fire. For example, if a prehistoric site is well-known to local artifact collectors but the site has been protected from vandalism by heavy shrubs or blackberry thickets, then prescribed fire may expose the site to illegal artifact collecting. Therefore, it may be appropriate to identify such sites as resources-at-risk. Some of the factors that should affect the classification of certain resource types as "at-risk" from indirect effects include proximity to public roads, public knowledge of the site(s), susceptibility to post-fire erosion, and visibility of archaeological deposits.

Identifying resources-at-risk predicates the need for, and type of, subsequent identification, evaluation, and management efforts. For one prescribed fire, resources-at-risk may be so inclusive that comprehensive, close-spaced transect archaeological survey is necessary to identify such resources, while another prescribed fire may have no resources-at-risk and field survey is not necessary.

Methods for locating cultural resources-at-risk should be appropriate to the nature and visibility of the resource classes. Windshield surveys, broad transect surveys, or use of aerial photographs may be appropriate for the identification of certain above-ground resources (e.g., cabins, fences, power poles). Selective examination of surface features may be appropriate to other classes, such as the examination of rock outcrops in areas known to contain rock art. If midden sites are listed as resources-at-risk, then close-spaced transect survey within certain environmental contexts may be necessary to identify those types of sites. The methods selected for identification efforts, and the rationale for these methods, should be documented in the Burn Plan or other fire management planning document appropriate to agency procedures. Methods for identifying resources-at-risk are described in greater detail in Attachment 1 of this

workbook.

> *The criteria for selective survey of prescribed burn project areas should be described in the protocol, including the SHPO/THPO role, if any, in reviewing selective survey strategies proposed by the Agency.*

### 2.4.3 Deferred Inventory

Ground surfaces within areas proposed for prescribed fire are often obscured by vegetation (hence the need for prescribed fire). Under conditions of heavy fuels buildup, many types of cultural resources are difficult, if not impossible to see. There is little point to conducting a pre-burn survey for surface and subsurface cultural resources if vegetation does not afford opportunities to discover cultural resources. Protocols should accommodate the potential for deferred survey if visibility is significantly impaired. Pre-burn survey strategies might target those types of resources that can be discovered despite ground-obscuring vegetation, such as standing structures, while survey for low-lying and surface-exposed archaeological sites would be deferred. Areas deferred for pre-burn survey might be subject to post-burn survey, or survey might be deferred indefinitely. The criteria for post-burn survey may be developed by Agency Units individually, within regions, or within whole states, in consultation with the SHPO/THPO

***Example***

The *Programmatic Agreement Between the Pacific Southwest Region, Forests of the Sierra Nevada, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation* (Sierra Nevada PA) includes a "module" that addresses prescribe fire called *Prescribed Fire and the Protection of Heritage Resources: A Heritage Resources Management Module Prepared for the USDA Forest Service, Pacific Southwest Region, National Forests of the Sierra Nevada.* The module contains the following language regarding deferred inventory:

> Deferred Inventory. At the discretion of the HRM [CRS], field survey may be deferred for areas of impenetrable brush and ground-obscuring vegetation that prevents the identification of resources of interest. These areas may be selectively examined after the prescribed fire, when ground visibility has improved.
>
> The *module* instructs Forests to conduct post-fire field surveys of a minimum of 20 percent of vegetated lands within prescribed fire areas. The CRS uses his/her discretion and professional judgment to select the specific areas and methods for post-fire survey according to the specific

circumstances. Slopes exceeding 30 percent and areas in which ground visibility remains obscured, may be excluded from the inventory sample. The criteria for sample inventory include any combination of the following:

- previously unsurveyed lands within the prescribed fire area;
- areas that were previously surveyed under pre-burn conditions (as a cross-check on past survey methods and quality);
- samples of various vegetation zones or biotic communities; or
- selective survey of areas suspected to contain heritage resources.

The full text of the criteria for post-fire sample inventory from the prescribed fire module of the Sierra Nevada PA is presented in Attachment 2 of this workbook.

*Protocols should accommodate the potential for deferred survey if visibility is significantly impaired. The prescribed fire protocol should specify the decision-making process for deferring field survey, as well as criteria or a decision-making process for post-fire survey*

### 2.4.4 Identifying Cultural Landscapes

Concern over the identification of cultural landscapes has grown over the last few years, although it remains erratic and inconsistent. The National Park Service has taken the lead in developing guidance regarding the identification and evaluation of cultural landscapes, as evidenced by publications such as *National Register Bulletin 30, Workbooks for Evaluating and Documenting Rural Historic Landscapes,* which provides information on conducting historic research, developing historic contexts, surveying, evaluating, and documenting cultural landscapes. Additional guidance is provided in the National Park Service *Director's Order #28, Cultural Resource Management Workbook, Chapter 7, Management of Cultural Landscapes* and *Appendix K, Selected Cultural Landscape Bibliography*. This information can be accessed at http://www.nps.gov/refdesk/DOrders/index.htm#old.

If the CRS gathers information indicating that cultural landscapes may be present or affected by a prescribed fire project, appropriate expertise should be enlisted. Examination of a cultural landscape may require the efforts of some combination of the following expertise: historians, landscape historians, architectural historians, architects, landscape architects, trained arborists, archaeologists, or anthropologists. Agencies should be particularly sensitive to the role of

environment or landscape on Traditional Cultural Properties. Additional discussion of cultural landscape is offered in Section 3.0 of this workbook.

### 2.4.5 Recording

Cultural resources identified during inventories for prescribed fires should be documented on cultural resource inventory forms appropriate to the agency and state. Contemporary professional standards, as set forth by the agency or the SHPO/THPO, and any other specialized forms mandated or desired by the agency, should be identified in the protocol.

> *Recording standards should be specified in protocols for prescribed fire projects and should meet the Secretary of Interior's Standards.*

## 2.5 CULTURAL RESOURCE EVALUATION

Approaches to cultural resources evaluation are as varied as inventory approaches. Although the National Register of Historic Places (NRHP) criteria serves as the common denominator, the manners in which different Agencies and SHPOs/THPOs interpret those criteria are vastly different. Some SHPOs expect Agencies to gather substantial evidence and offer detailed justifications to establish the NRHP eligibility of properties, while others routinely accept an Agency CRS's recommendations with little more than a summary description of the property and citation of the proposed criterion. These varying approaches require substantially different levels of effort to evaluate resources, particularly archaeological resources. Consequently, no single standard for evaluation will be acceptable to all SHPOs/THPOs and Agencies. This workbook offers options intended to meet the varying practices and needs of individual states and Agencies.

A common approach to streamlining the evaluation process, in states where the SHPO/THPO expect rigorous and thorough evaluations, is to defer NRHP evaluation if cultural resources can be avoided or protected. While the standard regulatory process defined at 36 CFR 800 requires the NRHP evaluation of properties with an undertaking's APE, deferring NRHP evaluation is acceptable under the umbrella of a programmatic agreement, which redefines how Agencies will meet their Section 106 responsibilities. Deferring evaluation may take the form of simply declaring certain classes of resources (or resources under certain environmental conditions) insensitive to fire damage, and declaring that such resources will be afforded no further management consideration for the prescribed fire project. As discussed earlier in this workbook, the Alaska NPS PA provides an example of this approach for subsurface and noncombustible resources.

Another approach to evaluation is to defer NRHP evaluation if the resource can be avoided or protected from damage. Standard protection measures can be cited to provide reviewing agencies, Indian tribes, and the public a clear picture of the options that the Agencies have to choose from to protect cultural resources.

***Example 1***

The Sierra Nevada PA's Prescribed Fire Module includes a provision that defers the need for NRHP evaluation and SHPO consultation if standard protection measures, also listed in the module, can be applied to protect resources from harm. The specific language from the module is presented below.

> Evaluation and Consultation. A Forest may implement a prescribed burn without evaluating heritage resources of interest and without pre-fire SHPO consultation when heritage resources of interest within the fire area are protected from damage with standard protection measures. If a Forest chooses an alternative form of protection…the Forest shall consult with the SHPO prior to the prescribed fire. The SHPO may recommend additional measures or determine that further consultation pursuant to process….
>
> If the Forests cannot or chooses not to protect heritage resources of interest, the Forests must evaluate those resources by applying the National Register of Historic Places criteria for eligibility described at 36 CFR 60.4, or apply alternative evaluation criteria accepted by the SHPO and Advisory Council under the terms of an agreement document…. (Sierra Nevada Prescribed Fire Module, Section 4.4.2)

***Example 2***

The Southwest Region USFS PA defines certain classes of cultural resources as NRHP by agreement with the SHPO. When such properties are identified, no SHPO consultation is needed to determine their NRHP status. Furthermore, the PA also allows Forests in the Southwest Region to treat properties as if they are NRHP eligible, even though their status remains unevaluated. The specific language regarding evaluation, and the list of categorically eligible properties used in the Southwest Region USFS PA is offered below (Stipulation 6 and Appendix C).

> 6. EVALUATION. The FS and the SHPOs agree that certain classes of properties (Appendix C) may be determined eligible

for the National Register of Historic Places for Section 106 purposes based on survey information without further, case-by-case SHPO consultation. The eligibility of other properties may remain unevaluated but treated as if eligible, unless the FS chooses to consult with the SHPO on individual eligibility determinations or adverse effects cannot be avoided. The FS shall consult with the SHPO and appropriate tribes concerning the eligibility of any traditional cultural properties identified by the tribes that cannot be protected from project effects.

## APPENDIX C

### LIST OF PROPERTIES THAT MAY BE CONSIDERED ELIGIBLE FOR PURPOSES OF THIS AGREEMENT

For eligibility determinations under this Agreement, the following types of heritage resources, provided they are 50 years old or older and clearly retain integrity, may be considered eligible for the National Register of Historic Places under criterion (d) without further SHPO consultation or concurrence:

-Properties with clear evidence for the presence of structures (historic structures, pueblos, pithouses,

-Apache/Navajo camps, etc.

-Properties with hundreds of surface artifacts

-Properties with clearly visible evidence of buried cultural deposits

-Properties with rock art

-Properties that clearly meet the National Register listing requirements in State historic contexts, existing multiple-property contexts, or SHPO-approved Forest-level historic contexts.

Other properties will be treated as if eligible, unless the FS chooses to make a determination of eligibility in consultation with the SHPO. The FS will consult with the SHPO and with appropriate tribes regarding the eligibility of any identified traditional cultural properties that cannot be protected from project effects. The SHPO will monitor eligibility determinations and discuss any problems at the annual meeting.

*The prescribed fire protocol must address cultural resource evaluation is some fashion. Reference should be made to the National Register of Historic Places, specifying if, under what circumstances, and how cultural resources will be evaluated. Indian Tribes and Native Hawaiian organizations should be consulted in determinations of NRHP eligibility or defining the values of any*

*properties to which they ascribe traditional religious and cultural significance;*

## 2.6 THE RESULTS OF IDENTIFICATION AND EVALUATION ACTIVITIES

### 2.6.1 When No Cultural Resources Are At Risk

There are three outcomes of the identification and evaluation effort that should conclude the consideration of cultural resources for individual prescribed fires, as follows:

(1) *No cultural resources are found*. The Agency may conclude that no cultural resources are present, if none are identified after conducting an intensive 100% survey, a selective survey, or survey is deferred due to obscurred ground visibility.

(2) *No historic properties are present*. Cultural resources may be present in the APE of the proposed prescribed fire, but those resources have been evaluated and found to be ineligible for the NRHP.

(3) *There are no cultural resources-at-risk*. Regardless of the type of survey conducted (or none at all), the Agency may determine that there are no resources at risk from damage resulting from the prescribed fire undertaking. There may be resources within the APE, but given their nature as well as the nature of the undertaking, the potentially important elements of those resources are unlikely to be damaged or destroyed.

If any of these circumstances exist after Agencies have followed their protocols for identification and evaluation, then the Agencies should be able to get their SHPO/THPO to agree that no further consultation or consideration of cultural resources is necessary prior to approving and conducting the prescribed fire. However, the Agencies should document the information-gathering and inventory effort according to professional standards. Guidance on developing consultation procedures when the Agency concludes that no cultural resources are at risk is described in Section 2.8.3 of this Workbook.

> *The prescribed fire protocol should define the circumstances under which the Agency can proceed with undertakings without consulting the SHPO/THPO.*

### 2.6.2 When Cultural Resources Are At Risk

The following circumstances warrant further consideration of cultural resources in the prescribed fire planning process:

(1) *Unevaluated cultural resources are found within the APE.* An Agency's protocols may allow them to defer NRHP evaluation if certain conditions apply (e.g., if the resource can be avoided or protected), but those conditions must be identified;

(2) *Cultural resources are evaluated and found to meet the NRHP Criteria.* Cultural resources are found within the APE and the Agency determines (under the terms of their protocol or under the traditional evaluation process) that cultural resources are NRHP eligible or will be treated as eligible. Again, further management consideration is necessary;

(3) *Cultural resources-at-risk are present within the APE.* If an Agency develops protocols that use the "resources-at-risk" concept for selective inventory, and such resources are found within the APE, then those resources may be affected unless they can be protected through some management measure. The specific management of such resources must be identified.

The following section describes possible procedures for considering cultural resources that fall under any of the three categories described above (i.e., those that may be affected by prescribed fire projects). Protocol documents for prescribed fire activities must address, in some fashion, how the Agency will manage such properties**.**

## 2.7 DETERMINING THE EFFECT OF PRESCRIBED FIRE PROJECTS

Under the terms of a programmatic agreement it is not necessary to determine the effects of an undertaking on historic properties in the traditional manner (e.g., no effect, no adverse effect, adverse effect). However, Agencies may structure their protocols in this fashion in order to use language and concepts that are familiar. Regulatory predictability can be established by predefining the various effect situations.

***Example 1***

The Southwestern Region USFS PA uses the traditional Section 106 "effect" terms to define the circumstances under which the participating Forests must consult with the SHPO and Advisory Council. The specific language of the Southwestern Region USFS PA is provided below.

> 7. EFFECT. Following completion of the survey strategy approved by the Forest Archaeologist in accordance with Stipulation 5, the FS

shall determine the effects of the WUI project on historic properties:

a) No Historic Properties Affected. If no properties are identified within the area of potential effect or if through application of the site protection measures in Appendix D potential effects have been excluded from all eligible and unevaluated properties, and provided that none of the conditions requiring case-by-case consultation specified in Stipulation 13 apply, a determination of "No Historic Properties Affected" will be made for the WUI project in accordance with 36 CFR 800.800.4(d)(1). For prescribed fires, this will include only those projects in which a 100% survey is conducted and all eligible and unevaluated properties will be protected. For other types of activities, if less than a 100% survey is conducted, the discussion of effects will include a rationale addressing the sufficiency of the level of effort.

b) No Adverse Effect. If properties are present but through application of the protection measures in Appendix D potential adverse effects on eligible and unevaluated properties have been minimized to the extent that they do not meet the criteria of Adverse Effect contained in 36 CFR 800.5(a)(1), and provided that none of the conditions requiring case-by-case consultation specified in Stipulation 13 apply, a finding of "No Adverse Effect" will be made for the WUI Project in accordance with 36 CFR 800.5(b). This shall include prescribed burns in which fire-sensitive properties will be protected.

c) Adverse Effect. If the Forest Archaeologist determines that a property(s) may be adversely affected, or in the case of a prescribed fire, a fire-sensitive property cannot be adequately protected, the FS shall consult case by case on the WUI project under 36 CFR 800.6, as specified in Stipulation 13 (Southwestern Region USFS PA: Stipulation 7).

***Example 2***

The Sierra Nevada PA Prescribed Fire Module calls for application of the criteria of effect and adverse effect only if the cultural values of "resources-at-risk" cannot be protected through the application of standard treatment measures. In this instance, the Agency essentially exits the PA process and consults with the SHPO and Advisory Council pursuant to the standard consultation process. Language from the Sierra Nevada PA Prescribed Fire Module is presented below.

Consultation. If evaluation determines that heritage resources of interest are NRHP eligible or retain moderate to high cultural values, and the Forest determines that it cannot protect those resources by applying the standard protection measures…then the Forests shall determine the nature of the effect that the undertaking may have on historic properties by applying the Criteria of Effect and Adverse Effect set forth at 36 CFR 800,

prior to a decision or action on a prescribed fire subject to consideration.

*While traditional definitions such as "effect" or "adverse effect" are unnecessary in an alternative process described in a prescribed fire protocol developed under the terms of the Fire PA, protocols must define the conditions under which Agencies may act unilaterally to protect or treat cultural resources, and those circumstances that will prompt consultation with the SHPO/THPO and others.*

## 2.8 PROTECTION AND TREATMENT OF CULTURAL RESOURCES

### 2.8.1 The Purpose of Standard Treatment

The purpose of this section is to provide guidance on various treatment measures that the Agencies might incorporate into Cultural Resource Elements of Fire Management Plans, Interim Protocols for fire management activities, or project-specific undertakings such as Burn Plans. The primary goal of promoting standard treatment measures is to provide the SHPO/THPO, Indian tribes, and the public with a clear picture of the management directions that the Agencies will take to ensure adequate treatment of cultural resources. Most SHPOs/THPOs are likely to agree that the Agencies may conduct prescribed fire projects without additional review if standard treatment measures are applied and cultural resource protection can be reasonably assured.

Protection and avoidance measures should be applied to cultural resources in ways that will provide the best possibility of protection of the known and potential cultural values associated with those resources. Agencies should consider both short- and long-term protection, however. Avoidance of all prescribed fire activity at the location of a cultural resource may provide good short-term protection, but does it protect the resource from long-term threats resulting from the buildup of fuels? Could avoidance or total protection hinder or make the Agency's fuels management plans less effective, resulting in higher long-term fire danger to life, property, and the cultural resources themselves?

### 2.8.2 Setting Treatment Priorities

Since Agencies cannot protect all cultural resources, they need to establish priorities for protection and avoidance. Some Agencies have accomplished this by categorizing cultural resources either by their sensitivity to fire damage and protecting only certain categories of properties, or assigning a protection status for every known cultural resource. An example of each approach is listed below.

***Example 1***

The Alaska NPS PA proposes to categorize every *known* cultural resource in the Parks into one of four protection statuses; critical protection, full protection, non-sensitive/defensible space protection, and non-sensitive protection. Each protection status is associated with actions that will be taken to manage the cultural resources. Although the Alaska NPS PA targets wildland fires, the same strategy can be applied under prescribed fire programs. The full text of the fire protection status assessment approach used in Alaska NPS PA is presented in Attachment 2 of this workbook.

***Example 2***

The Rocky Mountain PA identifies a number of historic property types that, by their nature, are at high risk from fire damage, as well as those that are at inherently low risk. Under the terms of that PA, only high-risk properties are avoided or protected. The description of avoidance and protection measures is brief and the methods of applying those measures are apparently left to the Agency. The language used to specify avoidance and protection in the Rocky Mountain PA is listed below.

> D. AVOIDANCE/PROTECTION MEASURES. Historic properties at high risk to damage by fire, as identified in Appendix D of this agreement, will be protected through the use of natural topographic features, previously constructed roads, fuel breaks, and non ground-disturbing techniques such as wet lines, and black lines. Other types of avoidance or mitigation measures will be detailed in the Inventory Report.

*Standard treatment measures should be described in sufficient detail that an independent reader can understand the type and level of protection that is afforded resources, including the level of risk and risk-minimizing procedures that are implemented (e.g., monitoring).*

### 2.8.3 Consultation When The Agency Concludes That There Will Be No Effect

The Agency may conclude that high-risk or sensitive cultural resources or historic properties can be effectively protected through the application of standard treatment measures. Agencies should consider streamlining the review process by proposing to eliminate or at least expediting/reducing review of prescribed fire projects under such circumstances.

If unevaluated cultural resources can be protected, then there is a potential to streamline the review process by deferring National Register evaluation and ensuring that resources will be substantially protected through the application of standard treatment measures. Streamlining of the consultation process should be negotiated to reduce or eliminate pre-fire SHPO/THPO consultation when resources-at-risk within fire areas are protected from damage with standard protection measures.

Depending on SHPO/THPO perspectives, standard treatment measures may be different between states, because the SHPOs/THPOs differ with regard to their opinions of what constitutes an effect or their relative tolerance of perceived minor effects. Some SHPOs/THPOs may want limit standard treatment measures to those that will offer little or no risk that any physical changes will occur to cultural resources. Those types of standard treatment measures are more likely to involve complete avoidance and the exclusion of fire or any ground disturbance, which is accomplished by placing fire lines around cultural resources. Other SHPOs/THPOs may accept treatment measures as "standard" even if those measures expose resources to some level of risk or affect physical traits not thought to be of central importance. Although some treatment measures may cause physical change, the objective of the treatment measure might be to protect the characteristics of the cultural resource that are most likely to define its importance. For example, a late prehistoric site containing abundant obsidian tools may be well-dated, yet have the potential to yield important information on the morphological range of variability of particular tool forms. Since the site is well-dated, obsidian hydration information would be unlikely to provide information that is not already in hand. Therefore, fire may be allow to burn over the site and exceed 500 degrees Centigrade, which is the threshold temperature demonstrated to alter obsidian hydration. As long as temperatures do not exceed 700-760 degrees Celsius, the frothing/melting point of obsidian.
Additionally, one does not always need to know whether a cultural resource is important to protect the attributes that *could* make it important. For example, a recreation residence in a National Forest might be National Register eligible for its vernacular architecture, yet managers do not need to know whether it is eligible or not to avoid physical change to the building or its immediate surroundings. Similarly, prehistoric sites with subsurface deposits may contain all sorts of buried features, yet managers do not need to know whether such features exist at the site to protect subsurface deposits.

In summary, the list of treatment measures that will be accepted as standard and applicable without resource evaluation and without consultation is likely to vary between SHPOs/THPOs and their relative sophistication with respect to fire effects to cultural resources. If a SHPO/THPO defines standard treatment measures that need no consultation narrowly, then the Agency might negotiate with the SHPO/THPO to consider a wider range of standard treatment measures that may be applied with expedited consultation. A list of treatment

measures is provided in Attachment 3. This list is by no means comprehensive. The circumstances under which treatment measure will be applied should be determined in consultation with the SHPO/THPO.

Reporting. The cultural resources inventory process, resource evaluations, and protective measures selected for the cultural resources, should described in a report that meets the information requirements and professional standards of the agency, incorporating or summarizing such information into NEPA documentation.

> *The criteria by which Agencies consider cultural resources unaffected by prescribed fire and for which no SHPO/THPO consultation will occur must be described in the protocol. Such circumstances may include: the absence of cultural resources within the project APE; the sole presence of cultural resources that are at low or no risk of damage from the undertaking; cultural resources that have been determined ineligible for the National Register by the Agency with concurrence from the SHPO/THPO; and unevaluated cultural resources or historic properties that will be protected or avoided through standard treatment measures that are clearly identified and programmatically accepted by the SHPO/THPO.*

### 2.8.4 When Agency Concludes Cultural Resources May Be Affected.

Agencies may determine that the protection of resources-at-risk is infeasible or undesirable for a number or reasons including: protective measures are prohibitively costly; cultural resources cannot be *confidently* protected; or the fire management goals cannot be achieved if the cultural resources are avoided or protected.

Evaluation. If Agencies cannot or choose not to protect resources-at-risk, the resources should be evaluated by applying the National Register of Historic Places (NRHP) criteria described at 36 CFR 60.4, or apply alternative evaluation criteria accepted by the SHPO under the terms of a standard protocol or other agreement ratified under Section 106. Again, the circumstance by which cultural resources must be evaluated is negotiated between the Agency and the SHPO/THPO under the terms of the Fire PA.

Consultation. If resources-at-risk are NRHP eligible or retain moderate to high cultural values, and the Agency determines that it cannot protect those values by applying the standard protection measures, then the prescribed fire protocol should specify how (not if) the Agency will determine the nature of the effect that the undertaking may have on historic properties, and

how (not if) the Agency will consult with the SHPO/THPO and Advisory Council prior to an agency decision or action.

> *The circumstances under which Agencies will consider a prescribed fire undertaking to have the potential to affect cultural resources and according to which the Agency will consult with the SHPO/THPO should be described in the protocol.*

## 2.9 MONITORING

Monitoring is necessary to ensure both the short and long-term success of cultural resource protection measures. It is in the interest of both the cultural resource specialist and agency manager to conduct monitoring so that the effects of fire can be accurately determined. This can prevent excessive and unsubstantiated claims of damage from fire and fire suppression, as well as helping to determine the true effects of fire and the effectiveness of treatment measures.

### 2.9.1 Pre-Burn Monitoring

Pre-burn recording of the condition of known cultural resources for which treatment measures have been applied is essential for establishing a comparative baseline to determine the effectiveness of the treatment measures that are applied. Such information is also useful for determining the effects of wildland fires and fire suppression. Cultural Resource Elements of Fire Management Plans, and protocols for fuels management projects should identify the manner in which pre-burn cultural resource conditions will be documented. Several agency units have developed specific forms for recording such information. One such form has been developed for the Eldorado National Forest by archaeologist Krista Deal, included in Attachment 4.

### 2.9.2 Activity Monitoring

Direct monitoring of prescribed fires as they burn over or around cultural resources may or may not be possible, depending on safety issues. Direct observation, obviously, is best for recording specific information regarding the nature of the fire behavior (e.g., flame height, fire mosaic, residence time), although there are surrogate measures for fire behavior and heating. The experience of the observer is also an important variable. Cultural resource specialists should either have training or experience in fire monitoring and observation, or work closely with fire management specialists to ensure accurate and pertinent observations. The use of monitoring forms for prescribed fire ensures that observations are both standard and complete. An example of a prescribed fire monitoring form developed for the Eldorado National Forest is included in Attachment 4.

### 2.9.3 Post-Fire Monitoring

Post-fire monitoring can accomplish four objectives:

- Determine the effectiveness of pre-fire archaeological survey(s);
- provide limited inventories of lands previously inaccessible due to dense brush and vegetation;
- determine the effectiveness of protective and treatment measures;
- provide more comprehensive management and research information; and
- facilitate compliance with the requirements of Section 110(a)(2) of the NHPA.

Specific areas and methods of post-fire monitoring should be selected by the CRS with regard to the specific circumstances of the proposed fire area and with consideration to the maximum management benefit to cultural resources. Post-fire monitoring may be directed to any combination of the following:

- previously unsurveyed lands within the prescribed fire area;
- areas that were previously surveyed prior to a prescribed fire (as a cross-check on past survey methods and quality);
- samples of various vegetation zones or biotic communities;
- areas excluded from pre-fire survey due to inaccessibility or obscure ground visibility;
- selective survey of areas suspected to contain cultural resources; and
- known cultural resource locations.

Agencies may negotiate a specific proportion of the burned areas for post-fire monitoring (e.g., a 20 percent sample), unless the overall acreage of the fire activity is small (e.g., less than 100 acres). Alternatively, Agencies may develop a post-fire sample survey decision-making process that is more flexible, if the SHPO/THPO will agree.

Agencies might consider a process of sample selection that requires no SHPO/THPO consultation regarding sampling if a certain sample size or proportion is routinely selected, but expedited SHPO/THPO consultation when a smaller sample or no post-fire monitoring is proposed.

### 2.9.4 Scheduling

Post-fire monitoring should be conducted soon after a fire, particularly if the fire occurs in the fall or early winter and rains are anticipated. Scheduling is important for post-fire monitoring and should target periods and conditions of maximum ground visibility (e.g., after the first post-fire rain or substantial wind that exposes mineral soils, and before new vegetation obscures the ground surface).

### 2.9.5 Ground Cover

Post-fire monitoring criteria should be flexible enough to exclude areas where ground visibility remains obscured.

### 2.9.6 Reporting

The results and conditions of post-fire monitoring shall be reported in a Cultural Resource Report that documents the inventory effort and measures taken to avoid or minimize impacts to cultural resources.

> *The goals of post-fire monitoring, and criteria for determining whether a prescribed fire area will be subject to post-fire monitoring, should be described in the protocol. The protocol should discuss sampling procedures and how the results of post-fire monitoring will be reported and used.*

## 2.10 RESEARCH AND EXPERIMENTATION

Long-term experimentation and research is necessary to better-understand the effects of prescribed fire on cultural resources and refine methods for resource protection. Experiments and research will be essential to test assumptions regarding the effects of prescribed fire on cultural resources.

Agencies should take advantage of opportunities to advance an understanding of the effects (both direct and indirect) of fire on archaeological and cultural materials where circumstances permit. Experimentation with new and innovative protection measures is also encouraged during prescribed fires. Research may be conducted when opportunities are presented by prescribed fires and during wild fire suppression, as long as the effectiveness of fire control and safety is not diminished.

Prescribed fire protocols may include a Element on research and experimentation. Given

uncertainties and variations in location, scheduling, funding, and opportunity, the research and experimentation Element of a protocol may be equally ambiguous, but it might establish priorities based on the resource types and management problems specific to the Agency Unit. Inclusion of a research and experimentation Element in the prescribed fire protocol, even if somewhat ambiguous, will demonstrate the Agency's desire to better understand the effects of fire on cultural resources and develop/refine methods of protection and management.

## 2.11 UNANTICIPATED EFFECTS

Agencies may occasionally find, during or after implementing a prescribed fire, that previously unidentified and unevaluated cultural resources may be or have been damaged by the prescribed fire undertaking. It is also possible that Agencies will find that protective measures have failed or cultural resources have been damaged in unanticipated ways. Stipulation VIII of the Fire PA directs Agencies to make reasonable efforts to avoid, minimize or mitigate adverse effects to such properties and either follow the procedures for discoveries and unanticipated effects described in accepted CREs or interim protocols, or follow the procedures described at 36 CFR 800.13(b-d).

> *The protocol for prescribed fire should set forth procedures for addressing unanticipated effects. Typically, such discoveries prompt the Agency to consult with the SHPO/THPO on measures to address the discovery. Agencies may either develop special procedures within their protocols, or follow the procedures*

## 2.12 REPORTING

The manner in which Agencies and Agency Units report and use cultural resource information varies considerably. Therefore, no single standard will meet all needs. Some Agencies may wish to incorporate cultural resources information in their NEPA documents, while others may produce stand-alone cultural resources reports from which information is extracted for NEPA compliance and/or the preparation of Prescribed Fire Burn Plans. The content and format of cultural resource reports should be defined in each protocol, which is subject to SHPO/THPO review. Regardless of variations in reporting formats, cultural resource reports prepared for prescribed fire undertakings should, at a minimum, meet the Secretary of Interior's Standards and Workbooks for Historical and Archeological Documentation.

*At a minimum, cultural resource information necessary to demonstrate an Agency's good faith effort to consider historic properties should include:*

- *the sources of information consulted in assessing information needs;*
- *the types of cultural resources known and anticipated within the project area of potential effects;*
- *methods selected for identifying cultural resources, and the rationale for their use, as appropriate;*
- *results of the identification effort, including known and discovered cultural resources;*
- *areas that could not be examined due to obscuring or excessive ground cover;*
- *recommendations for post-fire survey in terms of location, acreage, or sampling criteria; and*
- *a research element if the circumstances of prescribed fires present opportunities to conduct research or experimentation.*
- *an identification of cultural resources whose potential important values are at risk from the prescribed fire undertaking;*
- *the results of cultural resource evaluation; and/or*
- *measures the Agency will take to protect or minimize damage to cultural resources at risk.*

A tabular or matrix approach may be an efficient way to summarize information regarding cultural resources, their known or potential values, the risk to which they may be exposed from the prescribed fire activity, and treatment measures that will be applied to protect or minimize damage to cultural resources or historic properties. An example of such a matrix is presented in Table 1.

**Example Cultural Resource Identification and Treatment Matrix for Prescribed Fire Project**

| Resource Name | Attributes at Risk | Risk Conditions or Activities | Management Objective Desired Condition | Treatments Alternatives/Options |
|---|---|---|---|---|
| Stumpy's Cabin | Cabin and wooded setting. | Brush and undergrowth creates fuel load; structure is highly flammable. | Maintain structure and open, wooded surroundings (40 trees/acre). | Create fire line >100 m beyond cabin, remove brush and slash by hand. |
| Native American archaeological village site | 1. Surface features.<br>2. Subsurface charcoal.<br>3. Surface artifacts. | 1. Devegetation, erosion, collapse.<br>2. Introduce new carbon into features.<br>3. Mineral soils exposed. | 1. Maintain anchoring, shallow-root vegetation.<br>2. Eliminate root burn.<br>3. Maintain surface vegetation cover. | 1. Hand remove all dead woody fuels from ground.<br>2. Hand-cut trees/brush & cover stumps with dirt.<br>3a. Hand-remove woody debris and don't burn duff.<br>3b. Controlled post-fire surface-collection of artifacts.<br>3c. Hand-place duff or ground cover after burn. |
| Hudunit Petroglyph Site | 1-2. Petroglyphs on horizontal outcrops.<br>3. Lichen, patina. | 1. Sooting, exfoliation of granite.<br>2. Wear damage from pedestrian & vehicular traffic.<br>3. Burning of lichens and alteration of patina. | 1. Avoid burning on horizontal granite outcrops.<br>2. Avoid abrasion/wear of design elements & avoid introducing new wear or markings<br>3. Avoid burning over rock surface & keep temperature <200 deg. C. | 1. Hand remove all woody fuels from surface granite and within 10 meters of rock art panels<br>2. Exclude mechanical equipment. and foot traffic on rock art panels.<br>3. Exclude fire from surface of rock art panels. |
| Elmo's Homestead Trash Dump | Complete or diagnostic artifacts. | 1. Thermal fracture<br>2. Crushing from mechanical equipment.<br>3. Exposure to unauthorized collection. | 1. Maintain cool surface temp.<br>2. Avoid crushing artifacts.<br>3. Maintain security of location & protection from collectors. | 1. Reduce woody fuels to keep temp <400 C.<br>2. Exclude mechanical equipment.<br>3. Notify law enforcement and place signage. |
| World-renewal Ceremonial Site | 1. Secrecy of location.<br>2. Tree cover.<br>3. Undisturbed ground. | 1. Location disclosed to public.<br>2. Increase visibility by removing vegetation.<br>3. Ground disturbance from heavy equipment. | 1. Site function kept secret.<br>2. Maintain major vegetation.<br>3. Maintain undisturbed ground. | 1. Prescriptions imposed w/o disclosing function.<br>2. Hand-remove dead fuel load, apply light burn only, if at all, in consultation with tribe.<br>3. Exclude heavy equipment, fire lines, fire camps. |

# 3.0 MECHANICAL FUEL REDUCTION

## 3.1 PURPOSE

The reduction of flammable fuels to protect life and property, including cultural resources, is accomplished primarily through prescribed fire, mechanical, and manual fuel reduction. Mechanical fuel reduction refers to the manual or machine removal of flammable, non-cultural materials from an environment. Fire may be used to consume fuels in mechanical fuel reduction projects, but this use of fire is distinguished from prescribed fire because it is limited to fuels that have been relocated to centralized locations such as slash piles, whereas prescribed fire refers to *in situ* burning of fuels on the landscape. The discussion in the following pages are intended to facilitate the development of protocols for the consideration of cultural resources during manual and mechanical removal of flammable fuels undertakings.

## 3.2 DEFINING MECHANICAL REDUCTION UNDERTAKINGS BY LEVEL OF RISK

### 3.2.1 Low-Risk Mechanical Fuel Reduction Undertakings

Low-risk mechanical fuel reduction undertakings have little or no potential to affect historic properties or unevaluated cultural resources. Low-risk projects may include landscape maintenance activities (e.g., pruning, limbing, and clearing the ground of vegetation debris), which may be included under the terms of existing agreement documents for various agencies. For example, routine grounds maintenance, including grass cutting and tree trimming, are programmatically excluded from review by SHPOs or the Council under the terms of the *Programmatic Agreement Among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers* (1995). When such agreements exist and projects qualify under the terms of those agreements, then the agency's Section 106 responsibilities may be satisfied by following the terms of those agreements.

Low-risk mechanical fuel reduction may also involve more energy-intensive activities such as the cutting, felling, and removal of trees, heavy undergrowth, downed trees, shrubs, and duff. Piling and burning of removed fuels may also occur. However, to be considered low-risk, such activities must not have the potential to affect historic properties and unevaluated cultural resources. This may be because such resources do not occur, or are unlikely to occur, within mechanical fuel reduction areas. Screening of the undertakings is necessary to ensure that historic properties will not be affected.

### 3.2.2 High-Risk Mechanical Fuel Reduction Undertakings

High-risk mechanical fuel reduction activities are those that, by their very nature, have a relatively high potential to damage or destroy historic properties. In general, high-risk projects involve ground disturbance. High-risk activities may also include those for which: (1) there are known historic properties or unevaluated cultural resources; or (2) there is a high probability that such resources occur within the mechanical fuel reduction project area; and (3) there is a potential for such resources to be affected by the mechanical reduction activities. The involvement of a CRS is necessary, prior to high-risk fuel reduction activities, to ensure that historic properties are located and protective measures are implemented.

### 3.2.3 Screening for High-Risk Projects

One possible approach to streamlining the management process for mechanical fuels reduction is to screen fuels projects to determine the level of risk that cultural resources may be exposed to, and consequently select the appropriate level and type of cultural resources inventory that is appropriate. Cultural Resource Specialists (CRSs) for the Agency Unit may screen each proposed mechanical fuel reduction project to determine its potential to affect historic properties and unevaluated cultural resources. The need for additional cultural resources inventory might be determined by the outcome of that screening process. For example, fuels reduction projects that have little potential to affect such resources might be considered low-risk projects and little or no further cultural resource consideration might be recommended prior to implementing the undertaking. On the other hand, mechanical fuels reduction projects such as those that use heavy equipment in areas known to contain numerous cultural resources should be considered high-risk projects, and the Agency's protocols might include field survey to identify cultural resources that might be affected by the mechanical reduction project. If the level of inventory has been determined according to the level of risk or sensitivity, then inventory, evaluation, and management procedures developed for prescribed fire undertakings can be followed to consider the effects of the undertaking on cultural resources and historic properties.

As with prescribed fire, Agencies should develop protocols that are compatible with their planning needs and operating procedures. In essence, the procedures for mechanical reduction include all of the essential considerations described for prescribed fire. These workbooks call out mechanical reduction separately because of the wide range of risk conditions that are presented by different methods and intensities of mechanical fuel reduction.

**Qualifications for Project Screening.** If Agencies choose to develop protocols that involve screening mechanical fuel reduction projects, those protocols should ensure that individuals screening the projects are qualified to determine the potential for effects to cultural resources. Screening involves using existing information regarding location and nature of cultural resources in light of the location and method proposed for mechanical fuel reduction to arrive at an assessment of the level of risk presented by the proposed project to historic properties and

unevaluated cultural resources. The CRS on each Agency Unit should be the person designated to screen each proposed mechanical fuel reduction project, although the CRS must be sufficiently knowledgeable to understand the nature of the mechanical reduction project and their potential for resource disturbance.

**Screening Workbooks.** The CRS must have specific information in order to render a determination of whether a mechanical or manual fuel reduction project involves low- or high-risks, and what additional historic preservation activities are needed, if any. Project information includes the specific location of the project, the size of the area, the nature of the fuels that will be removed (e.g., downed slash, standing trees, duff), the methods of fuel reduction, and the methods of removal (e.g., physical movement of material to another location, chipping, burning in piles).

The CRS should consider existing information regarding cultural resources within the project area. Personal familiarity, agency inventory files, historic and prehistoric overviews, histories, or regional cultural resource studies are some of the sources of information that should be consulted in determining the potential for damage to historic properties or unevaluated cultural resources. In addition, consultation with Indian tribes and persons known to have interests in or special knowledge of cultural resources within proposed mechanical fuel reduction project areas may also provide needed information prior to determining whether a mechanical reduction project involves low-risk or high-risk activities.

Background research should be scaled to the magnitude and type of mechanical fuel reduction that is proposed. For example, the hand-removal of downed woody fuels with no ground disturbance warrants more modest background research than a large mechanical reduction project using heavy equipment, because there is little potential for cultural resources to be affected. However, there are certain regions and circumstances under which even hand-removal can pose a threat to potentially important cultural resources. For example, late prehistoric and early historic wooden cultural remains such as wickiups or storage structures may be present in the Great Basin and Rocky Mountains regions. Such resources may appear as piles of branches to the untrained eye. These and other similar wooden resources easily could be unknowingly removed and destroyed if CRSs are not vigilant and thorough in considering the nature of cultural resources within the proposed project area and acting accordingly. Should the CRS identify such potential, then mechanical fuel reduction activities should be considered high-risk, warranting additional historic preservation activities.

In screening mechanical fuel reduction activities to determine whether they are low-risk or high-risk, CRSs should consider the following circumstances:

(1) Are there known or suspected cultural resources within the project area that may be sensitive to damage from mechanical fuel reduction?
(2) Does the project involve burn piles?
(3) Could project activities remove cultural debris more than 50 years old?
(4) Are new roads or trails needed?
(5) Are large trees (e.g., larger than 12 inches in diameter) proposed for removal?
(6) Is heavy equipment to be used off-road for the removal of downed fuels?
(7) Will the project involve the removal of vegetation with landscaped areas?
(8) Have Indian tribes or other interested persons been consulted regarding sensitive cultural resources within the mechanical fuel reduction area?
(9) Could the environment or setting be important in conveying the significance of historic properties that may occur within the project area?

Affirmative answers to these questions should alert the CRS to be particularly sensitive to the potential of mechanical fuel reduction projects to affect historic properties or unevaluated cultural resources. If the CRS determines that known historic properties or unevaluated cultural resources may be affected by the mechanical fuel reduction project, then project activities should be considered high-risk and additional historic preservation activities must be conducted.

**Determining Risk at the Wildland/Urban Interface.** The focus of mechanical fuel reduction at the Wildland/Urban Interface or other areas occupied or habitually used by humans is the protection of flammable buildings and structures. Mechanical fuel reduction surrounding buildings and structures usually involves the reduction of dense fuel loads through pruning, thinning, and limbing, as well as the removal of young "volunteer" trees and shrubs, downed trees and slash, underbrush, and grass and leaf litter. The thinning or removal of fuels surrounding structures is generally accomplished by hand and light equipment, and involves little or no ground disturbance. Hand removal includes the manual cutting, trimming, limbing felling and/or movement of flammable materials with hand-held tools such as motorized and unmotorized saws, axes, scythes, motorized line and blade trimmers, rakes, motorized and unmotorized grass/weed mowers, and rakes. Such removal is considered to have little potential to damage or destroy historic properties.

Both documented and undocumented cultural remains such as collapsed buildings or structures may occur in areas subject to mechanical fuels reduction. If such cultural remains need to be managed as excessive fuels, then they should be evaluated and managed accordingly. Agencies should follow their protocols for unevaluated cultural resources or historic properties that cannot be protected.

### 3.2.4 Management Decisions Based on Screening Results

Screening mechanical fuel reduction projects might result in one the following determinations.

(1) *Low-Risk Undertakings.* The CRS may conclude that the project involves activities that have a low risk of affecting cultural resources. The Agency should consider including in their protocol a provision that no further consideration of cultural resources is necessary prior to implementing the mechanical fuel reduction project;

(2) *High Risk Undertakings.* The CRS may conclude that the project has a high-risk of affecting cultural resources and additional historic preservation activities would be appropriate. Additional historic preservation activities might include a field survey to identify historic properties and unevaluated cultural resources, and the application of standard treatment measures to ensure that resources are protected or avoided (i.e., following the protocol developed for prescribed fire). If previously unevaluated cultural resources cannot be avoided or protected, then some form of evaluation should be implemented, and consultation with the SHPO/THPO and Indian tribes, as appropriate, to consider the effects of the undertaking on historic properties. Again, the specific nature of these historic preservation activities are developed and negotiated in the protocol. Those procedures should probably be the same or similar to those developed for prescribed fire undertakings.

### 3.2.5 Considering Cultural Landscapes

Cultural landscapes are geographic areas, including both cultural and natural resources and the wildlife or domestic animals therein, associated with an historical event, an activity, a person, or that exhibits other cultural or aesthetic values. The National Park Service has defined four general types of cultural landscapes:

- *historic designed landscapes* are significant as designs or work of art. These landscapes were consciously designed and laid out, and have historic associations with significant persons, trends, or movements in landscape gardening or architecture. Since this type of landscape was consciously designed and laid out, the relationship between landscape elements are often rather formal and obvious. Most historic designed landscapes will be associated with buildings or structures, and will seldom stand alone and divorced from other associated human activities. As such, there is little potential for historic designed landscapes to be unrecognizable and inadvertently damaged by mechanical reduction activities;

- *historic vernacular landscapes* reflect endemic traditions, customs, beliefs, or values, social behavior, and individual actions over time. Historic vernacular landscapes are

manifested in physical features and materials and their interrelationships, such as patterns of spatial organization, land use, circulation, vegetation, structures, and objects. These landscapes reflect the customs and everyday lives of people through physical, biological, and cultural features. Given the ongoing, contemporary use of historic vernacular landscapes, is it unlikely they will be unrecognized and inadvertently damaged by mechanical fuels reduction. Background research and public participations should result in their identification and management.

- *historic sites* are significant for their association with historic events, activities, or persons. They may or may not exhibit elements of design or formal structure, depending on the historic context of the event or activity with which they are associated. As such, they may be occasionally difficult to identify through field survey alone. Historical research is likely to indicate the location of potential historic sites landscapes. Such landscapes must retain physical remnants such as vegetation types and associations, relationships between buildings or structures, or surrounding environmental characteristics that evoke a sense of time and place associated with the historic events, activities, or persons.

- ethnographic landscapes contain a variety of natural and cultural resources that people associated with that landscape regard as heritage resources. Plant communities, animals, subsistence areas, and ceremonial areas can be included in these ethnographic landscapes. Examples of ethnographic landscapes can include contemporary urban settlements such as neighborhoods of New Orleans but can also include less obvious areas such as Devil's Tower geological formations or the Timbisha Shoshone community at Death Valley. Because the important elements of ethnographic landscapes are defined by the people who use them, such landscapes and their critical elements cannot be defined without public participation. Fuels management projects have the potential to affect elements of this landscape if public participation and consultation is not conducted.

*National Register Bulletin 30, Workbooks for Evaluating and Documenting Rural Historic Landscapes*, provides information on conducting historic research, developing historic contexts, surveying, evaluating, and documenting cultural landscapes. Additional guidance is provided in the National Park Service *Director's Order #28, Cultural Resource Management Workbook, Chapter 7, Management of Cultural Landscapes* and *Appendix K, Selected Cultural Landscape Bibliography*. This information can be accessed at http://www.nps.gov/refdesk/DOrders/index.htm#old.

If the CRS screening a mechanical fuel reduction project gathers information indicating that cultural landscapes may be present or affected by a mechanical fuel reduction project, appropriate expertise should be enlisted. Examination of a cultural landscape may require the

efforts of some combination of the following expertise: historians, landscape historians, architectural historians, architects, landscape architects, trained arborists, archaeologists, or anthropologists. Agencies should be particularly sensitive to the role of environment or landscape on Traditional Cultural Properties.

## ATTACHMENT 1. GUIDANCE ON USING THE "CULTURAL RESOURCES-AT-RISK" APPROACH TO IDENTIFICATION

Some cultural resources have little potential to be damaged by prescribed fire, and inventory strategies need not be developed to identify them. For example, the scientific information and other cultural value contained in bedrock milling features are unlikely to be damaged by a prescribed fire passing over them. Therefore, there is no need to search for such resources within areas that will simply burn over.

This section of Attachment 1 provides guidance on how to determine the kinds of cultural resources that will be the target of inventories, and how inventory strategies are constructed to find only those resource types. Such determinations will vary with the geographic location, the nature of the cultural resources that exist there, and the methods used for the prescribed fire.

***Steps***

1. Develop or identify historic contexts for the prescribe fire area

2. For each historic context, identify associated archaeological or historical resource types that are known or likely to occur within the project area.

3. Identify the elements or attributes of the resources that impart or retain cultural values.

4. Assess the risk of damage to the resource elements that retain cultural value.

5. Based on that assessment, determine if individual resource types are resources-at-risk.

6. Develop a cultural resources inventory strategy to identify cultural resources-at-risk.

***Step 1. Develop/Identify Historic Contexts.*** Cultural resources should be managed according to their contribution to or role in historic contexts. Historic context statements can provide the backdrop by which the potential importance of resource classes and individual resources are demonstrated. Historic context statements are developed from existing information. The historic context identifies a theme and time period associated with that theme. Themes represent historical or prehistoric patterns of events and activities that are somehow related. In other words, themes are the organizing concepts by which to identify human activities and cultural resources. For example, the California Gold Rush immigration could be a theme that relates a variety of mid-19th century historical and archaeological sites. The importance of each resource type is referenced by its relationship to the theme. Historic context statements and supporting text need not be lengthy, but they should concisely indicate the state of knowledge concerning the context and associated resources.

***Step 2. Identify Cultural Resource Types.*** A cultural resource class is a group of archaeological or historical sites or objects that share common physical characteristics. The resource type represents a specific set of human activities. Following the previous example, Gold Rush immigration is represented by trails, wagon roads, passes, way stations, graves, and campsites. Examples of prehistoric resource types are flaked stone scatters, bedrock milling features, and petroglyphs.

Individual resources may or may not be important, depending on their relationship to a theme or historic context. For example, there is nothing inherently important about a trail, but if that trail is associated with the California Gold Rush it may be quite important as a physical reminder of that formative period in California history.

***Step 3. Identify Cultural Resource Elements.*** Elements are the individual physical Elements or constituents of a resource type. For simple resource types, elements and resources may be one and the same. However, many cultural resource types are a composite of elements. For example, a log cabin's elements can include log walls, a foundation, doors, windows, a roof, etc. The reason that it may be important to identify the specific elements of a resource is that some elements may be susceptible to damage while others may not. For example, a log cabin with standing walls is susceptible to fire damage, while the foundation is not.

The selection of cultural resources-at-risk will determine what is sought out during an inventory effort. Inventory methods are developed to identify only the resources-at-risk. Other resources are unlikely to be identified nor will they be afforded special protective or management consideration for the purposes of the prescribed fire.

***Step 4. Assess the risk of damage to the resource elements that retain cultural value.*** There are three possible outcomes to the assessment of risk to resource elements and types. First, a resource type may have little cultural value, in which case the risk of damage to such resources are inconsequential. Isolated tin cans may be such an example. Caution must be exercised in making a unilateral determination that cultural resource types have no cultural value, however, as such a determination may foreclose the opportunity of review agencies and interested parties to understand the consequences of the fire activity. If cultural resources are determined to have little or no cultural value, then they are not resources-at-risk, no effort is made to identify such resources, and they are afforded no further management consideration for the prescribed fire.

A second possible outcome is that a potentially important resource class is present within the fire activity area, but the activity will not damage any of its important cultural elements. For example, a fire that burns over the land scars from historic mining is unlikely to damage elements such as tailings piles, glory holes, ditches, or adits. This circumstance may apply to many cultural resources.

Similarly, certain elements of a cultural resource may be susceptible to damage from fire, but

those specific elements may not retain cultural value. One example is a prehistoric archaeological site that has been burned repeatedly in the past from natural and human-induced wildfires. The proposed prescribed fire is yet another episode of surface burning and may not further affect those portions or elements of the resource that retain cultural values. Land use or fire histories may be useful in identifying such circumstances. If cultural resources are unlikely to be affected by the fire activity, they are not resources-at-risk, no effort is made to inventory them, and they are afforded no further management consideration for the specific fire activity. It is important to note that a cultural resource may not be a resource at risk from a prescribed fire, but this does not mean that the resource is unimportant or should not be afforded management consideration for other land use activities.

The third possible outcome of the assessment of risk is the finding that important cultural resource types and their important elements are likely to be damaged or destroyed by fire.

**Step 5. Identify Resources-at-risk.** Cultural resources that retain potentially important elements that are likely to be damaged or destroyed by some aspect of a prescribed fire are resources-at-risk. These resources are the primary targets of a further identification/inventory effort. Resources-at-risk may vary according to the specific activities involved in a prescribed fire. For example, a stone foundation is unlikely to be damaged by fire, but it is likely to be damaged by a fire line created with a bulldozer.

**Step 6. Develop a Cultural Resources Inventory Strategy.** Once all of the resources-at-risk have been identified, the agency CRS is ready to develop an inventory strategy. The strategy should be developed to encounter all cultural resources-at-risk within the project areas. In the previous example of a stone foundation that will not be damaged by fire itself, but would be damaged by a bulldozed fire line, the inventory strategy would be to walk the route of the fire line in search of stone foundations. The burn area would not be searched for such foundations, however.

**Case Study Example**

A prescribed fire is proposed for 1500 acres within the High Pothetical National Forest. The Cultural Resources Specialist (CRS) for the Forest has been charged with completing a cultural (heritage) resources inventory for the proposed burn area as a contribution to the Burn Plan.

***Project Understanding***. The CRS consulted with the Fire Management Specialist to understand the timing, nature, and location of the prescribed fire. This information included a detailed map that showed fire lines, fire camps, the burn area, and projected variations in fire intensity within the burn area.

***Information Search***. The CRS conducted a records and literature search using existing cultural resources overviews, the Forest GIS database, and existing cultural resources inventories. The CRS also consulted with local Native Americans to determine if there are any cultural resources

of importance to them within the burn area. Based on this information search, the CRS identified historic contexts and associated resources that are known and anticipated within the proposed prescribed fire area. Following is the summary historic context statement for railroad logging produced by the CRS.

***Historic Context for Railroad Logging.*** Nineteenth century railroad logging was the major historic activity characterizing land-use between 1870 and 1905 in the proposed prescribed fire area. The 19th century local economy was driven by railroad logging, which resulted in the development of local communities following initial gold rush settlement. The historical overview of the Forest reveals that the Rails and Nails Lumber Company obtained vast tracts of forested lands in the 1870s and established the mills and a company town named Splintersville. USGS maps dating to 1903 depict the railroad system as it had developed over a thirty-year period. Splintersville, two mills, and three structures along the railroad line (probably way stations) are indicated on the map. Twelve previous cultural resources surveys in the area have documented portions of the railroad logging system. Skid shacks, abandoned logging cabins, and trash dumps have been recorded, all within 150 meters of railroad grades, despite block surveys that cover greater distances from the grade. Despite the destruction of portions of the railroad grade by 20th century roads, some of the grades are visible. Steel rails were removed prior to World War I, and most wooden ties have been scavenged where contemporary roads pass through or near the railroad grade. A few short segments of grade retain badly decomposed ties. Buildings associated with the railroad logging operation are of two types; milled lumber buildings and log buildings. Milled lumber buildings, including the mills themselves, are all collapsed. Lumber from the mills has been scavenged and little is left, but collapsed buildings consisting of milled lumber piles are still present along the railroad grade. Despite considerable historic documentation of the railroad operation, archaeological deposits, including trash dumps, have the potential to reveal important information regarding the operation of 19th century company towns and the economic control that companies such as the Rails and Nails Lumber Company exerted over its employees. In addition, the mill locations and railroad grades serve as prominent reminders of the history that played a fundamental role in structuring the settlement and economy of the area.

Similar historic contexts were developed for prehistoric resources likely to occur within the prescribed fire area. These contexts were prehistoric stone tool manufacture represented by basalt quarry locations and flake scatters, and prehistoric plant processing represented by bedrock mortars, milling surfaces, and handstones.

***Risk Assessment.*** Several resource types are likely to be damaged or destroyed if not protected from prescribed fire activities. Wooden buildings and their remains, as well as trestles, are susceptible to burning and destruction from heavy equipment used to cut fire lines. Similarly, a hot fire and heavy equipment could melt and crush diagnostic artifacts in trash deposits. Prehistoric resource types, including basalt outcrops and flake scatters, and bedrock mortars and milling surfaces are resistant to damage from fire, which is likely to have burned over the area several times in the past. However, such resources may be damaged by heavy equipment.

***Resources-at-risk.*** Resources-at-risk for the prescribed fire includes railroad trestles, intact segments of railroad grade, wooden buildings and building remains, trash dumps, milling surfaces and handstones.

***Inventory Strategy***. Based on: (1) the information search and development of historic context for railroad logging, prehistoric stone tool manufacture, and prehistoric plant processing; (2) identification of resource types associated with railroad logging; (3) identification of the elements of those resource types that may retain cultural value; (4) an assessment of the risk to each resource type from the prescribed fire; and (5) identification of resources-at-risk, the CRS developed a strategy for finding those resources-at-risk within the burn area. Historic and current topographic maps were used to chart the route of historic railroad grades. The grades were subject to field survey, including 200 meters on each side of the grade to identify any buildings or trash deposits that might exist. In addition, the route of proposed fire lines and fire camps were examined in the field in search of resources-at-risk.

## ATTACHMENT 2. SELECTED EXCERPTS FROM PROGRAMMATIC AGREEMENTS REGARDING CULTURAL RESOURCES AND FIRE MANAGEMENT UNDERTAKINGS

The following pages contain excerpts from various programmatic agreements and planning documents developed by federal agencies. The excerpts were chosen for their relevance to the development of fuels management protocols. Many of the standard stipulations found in programmatic agreements were not included in the interest of brevity.

Excerpts From:

**PROGRAMMATIC AGREEMENT AMONG**
**THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,**
**THE COLORADO, WYOMING, SOUTH DAKOTA, NEBRASKA, AND KANSAS STATE HISTORIC PRESERVATION OFFICES,**
**AND**
**THE U.S.D.A. FOREST SERVICE, ROCKY MOUNTAIN REGION**
**REGARDING THE IMPLEMENTATION OF THE**
**PRESCRIBED FIRE PROGRAM**

(sections relating to identification strategy are excerpted below)

### STIPULATIONS

**The Rocky Mountain Region will ensure that the following measures are carried out:**

The Prescribed Fire Program encompasses two general project planning processes: individual, stand alone prescribed burn projects; and prescribed burning as a tool for meeting management objectives in a large scale analysis area such as that for a timber sale, landscape or watershed. There are usually no burn plans in place when the NEPA decision is made regarding the large-scale analysis area. The following sections specify the procedures that will be used in either case.

### I. RESPONSE TO SPECIFIC BURN PLANS ANALYZED UNDER THE NEPA PROCESS AS STAND ALONE UNDERTAKINGS.

A. THE ENVIRONMENTAL ANALYSIS. For a specific burn plan which documents burn units, levels of fireline intensity, location and type of firelines, and all other associated activities, and when a NEPA analysis is conducted for one or more specific burn plans, as stand alone undertakings, the Forest Service will carry out the following actions to identify, evaluate, and take into account the effects of the proposed prescribed fire on historic properties before issuing a NEPA decision:

1. The Forest shall use the NEPA scoping process and other means necessary to

identify consulting parties as required in 36 CFR 800.3(f).

2. The Forest shall conduct a literature search of existing information and compile a Literature Review identifying all known heritage resources in the analysis areas. The Literature Review will include information obtained during the literature search and through consultation with the appropriate SHPO, Indian tribes, and the public during the NEPA scoping process.
3. The Forest will complete a field inventory of the Area of Potential Effect of each prescribed burn following procedures defined in Appendix C. If so requested, the Forest will conduct additional consultation for the identification of properties of traditional cultural and religious significance to Indian tribes.

4. The Forest shall document the results of the field inventory, consultation with Indian Tribes regarding properties of traditional religious and cultural value, and any proposed measures to avoid adverse effects to historic properties in a report as defined in Stipulation IV.A. The Forest shall submit the Inventory Report to the SHPO and other consulting parties with a finding of effect pursuant to the requirements of 36 CFR 800.5. Once consultation is completed, the Agency Official may issue a Finding of No Significant Impact (FONSI) or the Record of Decision (ROD), specifying measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

**II. RESPONSE TO LARGE AREA ANALYSES WHERE A PRESCRIBED FIRE IS AN ASSOCIATED UNDERTAKING.**

A. THE ENVIRONMENTAL ANALYSIS**.** The following actions will be completed as part of the Forest's environmental analysis under NEPA, and prior to issuance of either a FONSI or ROD:

1. The Forest shall use the NEPA scoping process and other means necessary to identify consulting parties as required in 36 CFR 800.3(f).

2. The Forest shall conduct a literature search of existing information and compile a Literature Review identifying all known heritage resources in the analysis area and in a buffer zone measuring one mile in width around the analysis area. The Literature Review will include information obtained during the literature search and through consultation with the appropriate SHPO, Indian tribes, and the public during the NEPA scoping process.
3. The Environmental Analysis (EA) or Environmental Impact Statement (EIS) will include a heritage specialist Summary Report which does not disclose sensitive site information, but discusses significant sites within the areas potentially affected by prescribed burning, and the Forest will use this information as a basis for determining potential effects of the prescribed burn(s) on historic properties. The Finding of No Significant Impact (FONSI) or Record of Decision (ROD) will contain specific language

requiring the Forest to inventory for and assess effects to historic properties by a prescribed fire once a specific burn plan has been developed. The Decision Notice will also reference this agreement and condition the decision on completion of survey and compliance with applicable provisions of the NHPA .

B. POST DECISION ACTIONS. The following actions will be carried out by the Forests *after* the NEPA decision is made:

1. The Forest will develop a specific burn plan. The burn plan will define the proposed level of severity (low, moderate, and/or high) for the project. Project areas or burn units designated for a short duration, low and/or moderate level of fire severity will be subjected to a sample survey as defined in Appendix C. Those project areas or burn units which will have a long duration, moderate, and/or high level of fire severity will be subjected to intensive surveys.

2. If so requested by the SHPO or an Indian tribe, the Forest will conduct additional consultation for the identification of properties of traditional cultural and religious significance to Indian tribes or other interested parties.

3. The Forest will document the results of the field inventory, consultation with Indian tribes regarding properties of traditional religious and cultural value, and any proposed measures to avoid adverse effects to historic properties in a Report, as defined in Stipulation IV.A. The Forest will submit the Report for review and comment to the consulting parties pursuant to the requirements of Stipulation IV.A. The report will document a finding of either no historic properties affected pursuant to 36 CFR 800.4(d)(1), or no adverse effect, pursuant to 36 CFR 800.5(b) for the prescribed fire project(s);or that if avoidance is not possible, the Forest will apply the criteria of adverse effect in the Councils' regulations, 36 CFR 800.5(a), to determine if recorded historic properties in the Area of Potential Effect may be adversely affected by the proposed prescribed fire(s). If effects may be adverse, the Forest will consult with the SHPO and other appropriate parties in accordance with 36 CFR 800.6.

4. If the Forest Service determines that adverse effects cannot be avoided, or if SHPO objects to a finding of no adverse effect, the Forest will rescind the portion of the Decision Notice which implements the Prescribed Fire Activity for the analysis area and consult further in accordance with 36 CFR 800.6 to resolve the adverse effects.

## III. STANDARDS FOR IDENTIFICATION AND PROTECTION

A. SURVEY STRATEGY**.** The Forests will complete inventories within all areas defined as Areas of Potential Effect for a final prescribed burn plan using the survey strategy contained in

Appendix C. Appendix C may be revised in accordance with Stipulation IV.F.

B. TESTING THE SURVEY STRATEGY. The Forests shall periodically test the effectiveness of the sample survey strategy in two ways.

1. Sample Survey of Areas Considered to be of Low Site Potential - Before the prescribed fire, some areas of low site potential (not selected by the criteria for sample inventory) will be surveyed as a baseline test. The results of this testing may influence the survey model, which can be amended as needed in consultation with SHPOs.

2. Post Fire Surveys - After the prescribed fire, Forests will conduct post-fire surveys for some prescribed fire projects, in both high and low potential for sites. The rationale and specification of the acreage will be proposed in the inventory report, where the Forest identifies concerns for post-fire effects, such as potential accelerated erosion. Additional post-fire survey may also be done in conjunction with other agreements such as the range agreement, or for specific heritage resource program goals. The amount of post-fire survey acreage will be dependent upon the amount of acreage actually burned each year. The *number* and *type* of survey acreage will be listed in Appendix E, which shall be revised annually based on the Forests' projection of Annual Fire Plan Implementation activity. The additional post fire surveys will be used to evaluate the effectiveness of the survey strategy, and will be documented in the annual summary report.

C. EVALUATION. The Forest will follow procedures in 36 CFR Part 800.4 (c) to evaluate all historic properties which are located in targeted burn units or ground disturbing fire-line locations.

D. AVOIDANCE/PROTECTION MEASURES**.** Historic properties at high risk to damage by fire, as identified in Appendix D of this agreement, will be protected through the use of natural topographic features, previously constructed roads, fuel breaks, and non ground - disturbing techniques such as wet lines, and black lines. Other types of avoidance or mitigation measures will be detailed in the Inventory Report.

## APPENDIX C

## HERITAGE RESOURCE SURVEY STRATEGIES FOR THE ROCKY MOUNTAIN REGION PRESCRIBED FIRE PROGRAM

The following criteria will be used to identify areas selected for survey under this agreement, in order for the Forest Service to meet its responsibility under Section 106 of the National Historic Preservation Act, as amended. As a part of the process, the Forest will use topographical maps, aerial photographs, ortho-photo quads, historic documents, the Forest Cultural Resource Overview, information obtained from Native American contacts and other interested parties, and the "Resource Inventory System" (RIS) data base, when made available. The RIS data will include such information as cover type, slope, and soil type. Different survey strategies will be used in open and forested settings.

A field inventory will then be implemented. Prescribed fire units with a fireline intensity of short duration, low and/or moderate level of fire severity will be subjected to a sample survey as defined in I and II below. Those project areas or burn units that will have a projected fireline severity that would be moderate or high, and long duration will be subjected to intensive surveys.

### I. Criteria Common To All Burn Locations

1. In all cases, field observations will also be used in conjunction with the above criteria (II.2) to identify areas of high site potential that cannot be specifically noted until fieldwork begins.

2. All cultural resources identified as part of the inventories for the prescribed burning program, will be evaluated for their National Register eligibility.

3. All hand or machine constructed fire lines will be intensively surveyed.

**II. Open Grass and Sagebrush Settings** – short duration, low and/or moderate level of fire severity.

1. Previously recorded eligible and unevaluated properties will be inspected. A primary objective will be to identify any subsurface features that may be exposed to the surface,

such as a fire hearth, which could be affected by a low intensity/low duration fire.

2. Reconnaissance survey transects will be conducted through each burn unit to look for wood features, exposed archaeological features, and rock art panels, which could be effected by the prescribed fire. The reconnaissance survey will provide for a visual inspection of the open burn unit where the presence or absence of standing wood features can be confidently documented.

3. Survey transects will also be used to inspect stream cut-banks, road cuts and other open locations where there is potential for exposed sub-surface deposits or features.

4. All hand or machine constructed fire lines will be intensively surveyed.

**III. Forested Settings** – short duration, low and/or moderate level of fire severity.

1. Previously recorded eligible and unevaluated properties will be inspected. A primary concern will be to identify any subsurface features which may be exposed to the surface, such as a fire hearth, and which could be affected by a low intensity/low duration fire.

2. Intensive survey coverage will be implemented using a GIS model according to the following criteria:

   a. Forested areas with a slope of less than 35% and within .25 mile from permanent water (i.e. streams, creeks etc.).

   b. Geological features such as saddles, terraces, benches, overhangs, escarpment edges, and high points;

   c. Those areas regardless of slope and cover where chert-bearing formations are exposed or contain known stone quarry sites.

   d. Stream terraces or benches.

   e. Prominent rock faces that contain or are likely to contain Native American rock art properties.

   f. Historic structures (eligible, potentially eligible, or unevaluated) identified during the literature search process that includes a review of Forest files, county library, and courthouse records.

3. A limited number of acres outside of those listed in II.2 above (such as locations greater

than 35% slope and further than .25 miles from permanent water) will also be subject to intensive inventory.

4. All hand or machine constructed firelines will be intensively surveyed.

**IV. Burn Units (Open and Forested)** – long duration, moderate and/or high level of fire severity.

1. An intensive survey will be conducted over all areas where planned severity levels would be considered moderate or high and long duration.

2. All hand or machine constructed fire lines will be intensively surveyed.

## APPENDIX D
## LIST OF HIGH AND LOW RISK HISTORIC PROPERTIES

Three basic threats to historic properties were considered as part of the development of the list given below:

1. Threats from fire itself, or fire intensity;
2. Threats from fire control activities such as bulldozer lines, hand lines, retardant drops and staging areas;
3. Threats from post-fire erosion control or rehabilitation activities.

The list of high and low risk properties that may be affected by fire directly was developed through a review of available literature on the subject of fire effects on cultural resources. The primary sources for this review included *The Effects of Fire on Cultural Resources: A Survey of Literature Pertaining to Fire Control and Management* by William Kight, dated 1994 and *The Effects of Fire on Cultural Resources by Hal Keesling,* dated 1993. This list is not intended to be all-inclusive and may be amended as additional information becomes available.

High Risk:

Historic sites with standing, or down wooden structures or other flammable features.
Rock image sites.
Prehistoric sites with flammable architectural elements and other flammable features.
Prehistoric artifact scatters located in potentially unstable geomorphological settings.
Historic and prehistoric sites with the potential for hearths and datable charcoal or other fire sensitive deposits.
Prehistoric and historic cemeteries.
Peeled, or scarred pine tree sites.
Aspen art sites.
Traditional Cultural Properties (based on consultation with tribes)
Rockshelter Sites

Cultural Landscapes

Low Risk:

Prehistoric and historic sites with deeply buried cultural deposits.
Prehistoric and historic artifact scatters in stable settings.
Prehistoric and historic sites with non-flammable surface features.
Historic earthworks.
Sites officially determined ineligible for listing in the NRHP.

Excerpts From:

**Programmatic Agreement Among USDS Forest Service, Southwestern Region and Arizona State Historic Preservation Officer and New Mexico State Historic Preservation Officer and Advisory Council On Historic Preservation Regarding Wildland Urban Interface Hazardous Fuels Reduction Projects**

**STIPULATIONS**

2. INTERNAL COORDINATION AND TRACKING. The FS shall ensure that heritage specialists are brought into the planning for WUI projects as early as possible in the planning process, but no later than the identification stage, and that a system is in place to track implementation of heritage resource protection and monitoring requirements, and that necessary communication and coordination between fuels treatment specialists and heritage specialists will continue throughout the implementation of WUI projects carried out under this Agreement.

3. TRIBAL CONSULTATION. As early as possible in the planning process, but no later than the identification stage, the FS shall consult with American Indian tribes to determine if any properties of traditional cultural or religious importance are present within the WUI project's area of potential effect. If specific properties are identified, the FS shall consult with the appropriate tribes concerning evaluation, determination of effects, and protection measures. If agreement cannot be reached or if adverse effects cannot be avoided, the FS shall consult case-by-case with interested tribe(s) and the SHPO as provided for in Stipulation 13.

4. PUBLIC INVOLVEMENT. The FS shall use the NEPA scoping process and other means necessary to solicit input on heritage resource concerns and to identify consulting parties as required in 36 CFR 800.3(f).

5. IDENTIFICATION. The Forest Archaeologist shall determine or approve the level of field survey for each WUI project. If less than a 100% survey is proposed, the Forest Archaeologist shall notify the appropriate SHPO of the proposed survey strategy and rationale, using the workbooks. The SHPO shall provide any comments within 10 working days of receipt of the notification. The Forest Archaeologist shall take the SHPO's comments into account in finalizing the survey strategy. The finalized survey strategy will be provided to the SHPO upon request. If

no comments are received within the specified timeframe, the Forest Archaeologist may assume that the SHPO does not object to the submittal and may proceed with the identification strategy. Alternatively, a Forest may opt to develop a Forest-wide survey strategy for WUI projects in consultation with the SHPO and thereby eliminate the need for individual project notifications. As experience is gained with WUI projects, the goal is to develop a Region–wide set of WUI survey workbooks which can be incorporated…and used in lieu of case-by-case SHPO notification and review.

6. EVALUATION. The FS and the SHPOs agree that certain classes of properties (Appendix C) may be determined eligible for the National Register of Historic Places for Section 106 purposes based on survey information without further, case-by-case SHPO consultation. The eligibility of other properties may remain unevaluated but treated as if eligible, unless the FS chooses to consult with the SHPO on individual eligibility determinations or adverse effects cannot be avoided. The FS shall consult with the SHPO and appropriate tribes concerning the eligibility of any traditional cultural properties identified by the tribes that cannot be protected from project effects.

7. EFFECT. Following completion of the survey strategy approved by the Forest Archaeologist in accordance with Stipulation 5, the FS shall determine the effects of the WUI project on historic properties:

a) No Historic Properties Affected. If no properties are identified within the area of potential effect or if through application of the site protection measures in Appendix D potential effects have been excluded from all eligible and unevaluated properties, and provided that none of the conditions requiring case-by-case consultation specified in Stipulation 13 apply, a determination of "No Historic Properties Affected" will be made for the WUI project in accordance with 36 CFR 800.800.4(d)(1). For prescribed fires, this will include only those projects in which a 100% survey is conducted and all eligible and unevaluated properties will be protected. For other type of activities, if less than a 100% survey is conducted, the discussion of effects will include a rationale addressing the sufficiency of the level of effort.

b) No Adverse Effect. If properties are present but through application of the protection measures in Appendix D potential adverse effects on eligible and unevaluated properties have been minimized to the extent that they do not meet the criteria of Adverse Effect contained in 36 CFR 800.5(a)(1), and provided that none of the conditions requiring case-by-case consultation specified in Stipulation 13 apply, a finding of "No Adverse Effect" will be made for the WUI Project in accordance with 36 CFR 800.5(b). This shall include prescribed burns in which fire-sensitive properties will be protected.

c) Adverse Effect. If the Forest Archaeologist determines that a property(s) may be adversely affected, or in the case of a prescribed fire, a fire-sensitive property cannot be

adequately protected, the FS shall consult case by case on the WUI project under 36 CFR 800.6, as specified in Stipulation 13.

8. PROTECTION. The Forest Archaeologist shall draw from the protection measures in Appendix D to ensure that effects to historic properties (or fire-sensitive properties for prescribed fire undertakings) are avoided. Site protection requirements shall be documented in the inventory report (Stipulation 10) and on the FS Inventory Standards and Accounting (IS&A) form.

9. MONITORING. Terms and conditions of Section 106 compliance shall include appropriate post-project monitoring to assess effectiveness of protection measures in accordance with FSM 2361.28.5, including monitoring 20% of protected fire-sensitive sites in prescribed burn areas. In addition, each Forest will incorporate into the inventory report for at least one WUI project each year the requirement to monitor a minimum of 20% of sites not considered fire-sensitive within the burn area. For this monitoring, Forests will select WUI projects that offer good opportunities to assess the effects of prescribed fire on the types of sites not normally protected during burn implementation. Alternatively, the Forest Archaeologist may develop, in consultation with the SHPO, a different monitoring strategy for a WUI project or group of projects. The purpose of post-treatment monitoring is to gather data that will be used to improve planning for protection of heritage resources in future WUI projects. Forests are encouraged to monitor a sample of sites not considered fire-sensitive in more than one WUI project per year when feasible to expand available information on the effects of prescribed fire on historic properties. Site-specific monitoring requirements will be documented in the inventory report and on the IS&A form. Each Forest shall maintain an updated list of sites to be monitored which will include the date monitoring is planned, date completed, and monitoring results. This list and a summary of monitoring results will be included in the annual summary report to SHPOs and the Council (Stipulation 18).

## APPENDIX A

## HERITAGE RESOURCE SURVEY STRATEGIES FOR SOUTHWESTERN REGION WILDLAND URBAN INTERFACE PROJECTS

### Field Survey

The following general workbooks will guide the identification of areas selected for survey and the level of survey coverage:

1. Areas of intensive ground disturbance will receive 100% survey, including but not limited to:

- Intensive mechanical treatments (machine piling, windrowing, mechanical crushing, timber sale cutting units)
- Hand and mechanical fire line construction
- Staging areas, constructed safety zones
- Water bars and other constructed erosion control features

*2.* Prescribed burns. The goal of pre-treatment surveys is to identify sites that may be affected by the project and to collect specific information on the amount and character of fuels on individual sites that will serve as the basis to propose appropriate protection measures and monitoring requirements. As a minimum, surveys for prescribed burn areas will include:

- Inspection of previously-recorded fire-sensitive sites to document fuel loading, to determine protection needs, and to gather baseline data to assess sufficiency of protection measures during post-project monitoring;
- Survey of locations likely to contain additional fire-sensitive sites, based on pre-field research, expected fire behavior, and other relevant data; and
- For prescribed burns where sites not considered fire-sensitive will be monitored, inspection of a sample of other sites to document fuel loading and gather baseline data to assess effects of the project on those sites during post-project monitoring.

The survey strategy shall identify the types of sites that are considered fire-sensitive for each WUI project, using the workbooks in Appendix B. This should include both known fire-sensitive sites and other sites considered fire-sensitive for the specific burn, based on fuel loading, site characteristics, and expected fire behavior.

3. Additional survey needs for each WUI project will be evaluated and determined on a case-by-case basis, considering the following:

- Nature and severity of expected impacts
- Nature and extent of past surveys
- Nature and distribution of previously recorded sites
- Likely nature and distribution of as yet undiscovered sites

## APPENDIX B

## LIST OF FIRE-SENSITIVE SITES

A review of available literature on the effects on fire on cultural resources and on the experience of FS heritage resource specialists and SHPO staff in the Southwestern Region indicates that there are two categories of fire-sensitive sites. The first consists of sites long known to be vulnerable to the effects of even low-temperature fires and/or light fuel loads, such as sites that contain organic materials, exposed architecture, etc. The second group includes sites that have generally been considered to have less risk for fire effects in most situations, including prehistoric and historic sites with deeply buried cultural deposits; prehistoric and historic artifact scatters; and prehistoric and historic sites with non-flammable surface features. However, depending on field conditions-especially fuel loading-as well as specific site characteristics and expected fire behavior, these other site types may be fire-sensitive in certain WUI projects.

Known Fire-Sensitive Sites in the Southwestern Region:

- Historic sites with standing, or down wooden structures or other flammable features or artifacts
- Rock art sites
- Cliff dwellings
- Prehistoric sites with flammable architectural elements and other flammable features or artifacts
- Prehistoric sites with exposed building stone of soft or porous material such as volcanic tuff
- Culturally modified trees, including aspen art and peeled/scarred trees
- Certain traditional cultural properties (based on consultation with tribes)

Other Project-Specific Fire-Sensitive Sites:

- Other sites, based on local field conditions and Forest-specific concerns
- Other sites, based on consultation with SHPO staff
- Other sites, based on consultation with fire management staff, fire behavior specialists or fire effects researchers

Forest Archaeologists will use site assessment and monitoring data, and will consult with fire management staff, to identify known and other project-specific fire-sensitive sites for individual Forests or project areas. Fire-sensitive sites officially determined ineligible for the National Register of Historic Places do not require protection under Section 106.

## APPENDIX C

## LIST OF PROPERTIES THAT MAY BE CONSIDERED ELIGIBLE FOR PURPOSES OF THIS AGREEMENT

For eligibility determinations under this Agreement, the following types of heritage resources, provided they are 50 years old or older and clearly retain integrity, may be considered eligible for the National Register of Historic Places under criterion (d) without further SHPO consultation or concurrence:

- Properties with clear evidence for the presence of structures (historic structures, pueblos, pithouses, Apache/Navajo camps, etc.)
- Properties with hundreds of surface artifacts
- Properties with clearly visible evidence of buried cultural deposits
- Properties with rock art
- Properties that clearly meet the National Register listing requirements in State historic contexts, existing multiple-property contexts, or SHPO-approved Forest-level historic contexts.

Other properties will be treated as if eligible, unless the FS chooses to make a determination of eligibility in consultation with the SHPO. The FS will consult with the SHPO and with appropriate tribes regarding the eligibility of any identified traditional cultural properties that cannot be protected from project effects. The SHPO will monitor eligibility determinations and discuss any problems at the annual meeting.

## APPENDIX D

AGREED-UPON STANDARD SITE PROTECTION MEASURES

Various combinations of the following protection measures, presented here in checklist form, may be approved by the Forest Archaeologist to protect sites within WUI Projects without additional SHPO consultation.

___No thinning within site boundaries
___Allow thinning within site boundaries, provided:
    ___Hand thinning only
    ___Fell large diameter trees away from all features
    ___Hand-carry thinned material outside site boundary
___No use of mechanized equipment within site boundaries
___No staging of equipment within site boundaries
___No slash piles within site boundaries
___No ignition points within site boundaries
___Protect fire-sensitive sites:
    ___Exclude from project area
    ___Hand line
    ___Black line
    ___Wet line
    ___Foam retardant
    ___Structural fire shelter
    ___Remove heavy fuels from site by hand
    ___Prevent in-situ heavy fuels that cannot be removed from ignition (e.g., flush-cut & bury stumps)
    ___Implement same protective measures for future maintenance burns
___Protect selected other sites (option)
___Allow burning over other sites
___No fuelwood cutting or vehicles within site boundaries
___Allow fuelwood cutting within sites, but no vehicles within site boundaries
___Allow fuelwood cutting in areas of continuous, low-density scatters, with post-project monitoring
___Allow construction of safety zones and additional lines in 100% surveyed areas, w/ archaeological monitor to assure recorded sites are avoided

Post-Fire Monitoring

___Monitor a minimum of 20% of protected fire-sensitive sites following treatment, FSM 2361.28.5 (all projects; list sites to be monitored)

___Monitor a minimum of 20% of sites not considered fire-sensitive (apply to at least one WUI project annually; list sites to be monitored)

___Monitor burn itself (if concerns exist about protection of certain sites)

The Forest Archaeologist may approve additional measures to further protect sites; however, if a lesser level of protection is recommended, or if it is likely that adverse effects cannot be avoided, the FS shall consult with the SHPO on a case-by-case basis as specified in Stipulation 13.

## APPENDIX E

## PRESCRIBED WILDLAND URBAN INTERFACE FUELS TREATMENTS

On August 8, 2000, President Clinton asked Interior Secretary Bruce Babbitt and Agriculture Secretary Dan Glickman to prepare a report and to recommend how best to; 1) respond to the severe fires of the summer of 2000, 2) reduce the impacts of wildland fires on rural communities, and 3) ensure sufficient fire fighting resources in the future.

The President also asked for short-term actions that federal agencies—in cooperation with states, local communities, and tribes—could take to reduce immediate hazards to communities in the wildland-urban interface and to ensure that land managers and firefighters are prepared for extreme fire conditions in the future. This involves addressing the brush, small trees, and downed materials that have accumulated in many forests over the past century.

Reduction of fuels can be achieved in a variety of ways, including mechanical and manual thinning and the use of prescribed fire. Treatments in Wildland Urban Interface areas usually involve a two-fold approach. First and most urgent, in areas immediately adjacent to communities, thinning is used to create fuelbreaks capable of stopping or slowing a wildfire before it reaches homes and other developments. The slash that results from thinning can either be piled and safely burned or removed for fuelwood or other uses. In the areas leading up to the fuelbreaks, subsequent broadcast burning under prescribed conditions or a combination of thinning and burning can be used to reduce fuel loads in order to slow an approaching wildfire before it even reaches a fuelbreak. Both of these treatment strategies can help bring a crown fire to the ground, where it can be effectively and safely suppressed, thereby protecting life and property.

### WILDLAND URBAN INTERFACE PROJECTS IN THE SOUTHWESTERN REGION

The following prescriptions were developed to guide the Southwestern Region's implementation of hazardous fuels reduction treatments in the Wildland Urban Interface.

| VEGETATIVE TYPE | TREATMENT ACTIONS |
|---|---|
| Spruce-fir | Thinning, pile and burn, lopping, chipping, fuelbreaks. |

| | |
|---|---|
| Mixed Conifer | Thinning, pile and burn, lopping, chipping, fuelbreaks, broadcast burn. |
| Ponderosa Pine | Thinning, pile and burn, lopping, chipping, fuelbreaks, broadcast burn. |
| Pinyon/juniper and oak woodland | Agra-axe, hydro-axe, thinning, pile and burn, fuelbreaks, broad cast burn, crushing. |
| Grassland | Broadcast burn. |
| Sagebrush | Fuelbreaks, crushing, broadcast burn. |
| Chaparral | Crushing, thinning, chipping, broadcast burn, fuelbreaks. |
| Desert shrub | Crushing, fuelbreaks, broadcast burn. |

**SPRUCE-FIR**

Spruce-fir stands are intolerant to fire. Fire at low intensities will kill spruce and fir if even moderate amounts of slash surround the tree base or root crown, therefore treatment in spruce/fir Elements will be more limited in treatment options than the other vegetative types.

Mechanical treatments will most likely be preferred to provide the spacing necessary to eliminate interlocking crowns. Stands should be treated to reach an optimal basal area of 60 to 80 square feet per acre, and the understory must be removed to eliminate the laddering effect of fire. Remaining basal area per acre may be increased above 80 square feet per acre only if the residual stand can be limbed or pruned to a height of 25 feet or more. Fire as a tool in spruce-fir forests can be utilized to create wildlife openings, diversity within stands, or enhancement of aspen. Thinning with fire in the spruce-fir type is not recommended due to the intolerance of the species to fire.

Fuelbed reduction following mechanical treatment should be accomplished through fuelwood utilization by the public, or methods other than fire to ensure protection of the residual stand.

**MIXED CONIFER**

Mixed conifer stands primarily contain white fir, Douglas fir, corkbark fir, limber pine, and scattered ponderosa pine. Scattered spruce will also be found in the upper transition areas, and ponderosa pine will appear more frequently in the lower transition zones of the true mixed confer type.

Mixed conifer forests must be treated with mechanical means to reduce the current stand densities to a basal area of 40-60 square feet per acre within the areas of immediate threat. The treatment may also be feathered to increasing basal areas as distance from the immediate threat area increases. Prescribed fire may also be used initially in some areas but not in others, before some type of mechanical treatment, due to the high potential for escape.

Reducing the existing densities will most likely require multiple entries of both pre-commercial

and commercial operations including the reduction of other vegetative species along with seedlings, saplings, and brush.

**PONDEROSA PINE**

Ponderosa pine forests will be treated with both mechanical means and prescribed fire. The recommended treatment is to reduce existing basal area, for all species present, to 40 to 60 square feet per acres within the areas of immediate threat. The treatment may be feathered with increasing basal area per acre as distance from the immediate threat area increases. Many areas will require labor intensive mechanical thinning that may be followed by piling, removing, burning, chipping, or other methods that will alter the fuels profile. Long term, continued maintenance of these treatments is essential.

Reducing the ponderosa pine densities will most likely require multiple entries of both pre-commercial and commercial operations including the reduction of other vegetative species along with seedlings, saplings, and brush.

**PINYON/JUNIPER AND OAK WOODLAND**

Mechanical treatment and prescribed fire will be used to reduce stands to a basal area of 40-50 square feet per acre within the areas of immediate threat. Basal area per acre will increase as treatment moves further out, and may reach a basal area of 60-60 square feet per acres. The residual stand may be in small groups, clumps, or remain unevenly spaced. Areas treated in woodland stands will provide an open stand with an open canopy combined with reproduction of grasses, and scattered forbs and shrubs.

Fuelbed material should be removed with prescribed fire or utilized with fuelwood harvest or other methods.

**GRASSLAND**

Many grassland areas can be effectively treated with prescribed fire without mechanical treatment. Mechanical treatments such as crushing or grinding may be desirable in high-risk areas before fire is used.

**SAGEBRUSH**

Mechanical treatments such as crushing or grinding may be desirable in high-risk areas immediately adjacent to the WUI before prescribed fire is used. Many areas can be effectively treated with prescribed fire without mechanical treatment. Fire can be used to effectively remove sagebrush from existing sites with a corresponding reduction in flame lengths on future ignitions.

To maintain a site after initial treatment and where it can be safely executed, prescribed fire should continue to be utilized.

**DESERT SHRUB**

Mechanical treatment and prescribed fire may be used for conversion. Through the elimination of fire, areas that were once grasslands have evolved into the desert shrub communities that are currently present. The desert shrub communities consist in part of such species as mesquite, creosote brush, cacti, tarbrush, whitehorn, saltbush, snakeweed, and grasses such as gramma, tobosa grass and sacaton. Treatments within high-risk areas should be to protect the sensitive species while returning selected desert shrub back to a more natural grassland conditions ensuring successful suppression tactics.

**METHODS TO BE USED TO ACCOMPLISH PRESCRIPTIONS**

**FUELBREAKS** – Fuelbreaks are created to help change the behavior of a wildland fire by modifying the fuel structure in an area immediately adjacent to or surrounding developments and property to be protected in the wildland urban interface. Thinning for fuel reduction in fuelbreaks is more intense due to their nearness to values to be protected and strategic location for fire control. Fuelbreaks will vary in width according to the fuel profile and topography and may range up to 500' in width.

The fuelbreaks will often be "feathered" which means they will be incrementally less dense as they move toward the developed area. A distance around the fuelbreaks will also be thinned, possible up to thousands of acres, so that a fire's movement and intensity may be lessened as it approaches the main fuelbreak.

The arrangement of fuelbreaks will also differ. Some projects will have corridors of fuelbreaks, thinning within those breaks, and burning between them.

**THINNING** – Thinning reduces stand density by removing stems in the understory, midstory, and overstory. Thinning actions will vary between fuelbreaks and areas surrounding fuelbreaks. Thinning in fuelbreaks will include reducing tree density to 20' spacing between crowns to 40' spacing between groups. Thinning outside fuelbreaks will include thinning to 10' to 15' spacing between crowns. Pre-commercial thinning involves hand thinning of smaller diameter materials. Commercial thinning, accomplished through timber sales, involves larger materials.

Once thinning is accomplished, the slash will be treated in several ways, including piling the material so it can be burned. Usually < 3" material will be piled, while the > 3" material will be utilized for personal fuelwood or sold for commercial fuelwood. Piles will be burned in the fall and winter season and potentially during the summer if conditions become suitable. The actual

piling of the material may be accomplished by hand or machine, where equipment such as dozers and small tractors will haul the material to piles. Slash is also pushed or dragged into windrows. Some slash may be “rough-piled” or “jackpot piled” where heavier concentrations of fuel are left where they fall and are burned on site.

Material that is large enough for commercial thinning (merchantable timber), usually > 6“ may be removed to a landing using a rubber-tire skidder, or tracked vehicle. Both rubber-tire skidders and tracked skidders are used, but where slopes exceed 30%, tracked skidders are used more frequently because of their maneuverability. Whole tree skidding methods move the entire tree to the landing, and then remove the branches, concentrating the slash where it can be utilized as fuelwood or burned.

**LOPPING AND SCATTERING** - Thinned areas not piled may be “lopped” to reduce fuel slash heights and then broadcast burned. Lopping consists of cutting smaller branches off the main stem so the height of the slash layer is reduced, which in turn allows for a less intense fire if the are is broadcast burned.

**CRUSHING** - Crushing involves dragging a large drum with protruding spokes or spikes over the vegetation, effectively breaking the fuel into smaller pieces. Another form of crushing uses a “brush crusher” in which a piece of equipment similar to a “weed-whacker” is attached to a tractor. The “brush crusher” is able to reduce the height of vegetation from 4’ to 6’ down to 6” in height. Both of these pieces of equipment are pulled or transported by either rubber tire tractors, or rubber or metal track dozers. The “brush crusher” may operate on up to a 60% slope.

**CHIPPING** - In the chipping process, slash is forced through a chipping machine, reducing the larger pieces of slash to small chips that are spread over the site to be burned at a later date, or left on site to naturally decompose.

**HYDRO-AX AND AGRA-AX** - The Hydro-ax and Agra-ax are large cutting tools attached to a “Bobcat” type tractor. They are used in the pinyon/juniper type, cutting trees off at the ground level. The trees are usually left to lay where they fall, assisting in soil retention.

**BROADCAST BURNING** - Broadcast burning uses fire over a designated area to consume natural or activity slash that has not been piled or windrowed. Broadcast burning may be used separately or in conjunction with mechanical methods such as thinning. Broadcast burns may be ignited by hand, by “terra-torches”, torches mounted on 4-wheelers or on a flatbed truck, or with aerial ignition. Preparation for the burn may include line building, both by hand and machine.

**PILE BURNING** - Pile burning disposes of hand or machine-piled slash. Piling the slash and burning during cooler, wetter, or winter conditions reduces the chance of escape and lessens the potential for damage to the remaining vegetation on site. Piles are normally ignited by hand using fuses or drip torches.

Excerpts From:

**PRESCRIBED FIRE**

**AND THE**

**PROTECTION OF HERITAGE RESOURCES**

**A Heritage Resources Management Module**
**Prepared for the USDA Forest Service, Pacific Southwest Region,**
**National Forests of the Sierra Nevada**

## 1.0 SUMMARY OF PROCEDURES

Procedures for managing heritage resources related to prescribed fires include:

(1) Identification efforts that selectively focus on heritage resources of interest that may be important and may be susceptible to damage by fires (e.g., historic wooden buildings and structures, prehistoric midden sites);

(2) Exclusion from identification, evaluation, and management efforts of heritage resource types that have assumed low potential for fire damage (e.g., bedrock or boulder milling features, historic ditches);

(3) Deferred National Register evaluation of heritage resources of interest when those resources can be protected from fire damage through avoidance or the application of standard treatment measures. Heritage resources of interest are those that may be important, may be susceptible to fire damage, and are the focus of identification efforts;

(4) Deferred field surveys in areas of dense and ground-obscuring vegetation;

(5) Post-fire field surveys of portions of prescribed fire areas when ground visibility is improved; and

(6) Long-term research and experimentation regarding the effects of fire on heritage resources.

### 4.1 IDENTIFYING THE UNDERTAKING

#### 4.1.1 Planning

Depending on the size and complexity of the proposed fire, 6-12 months of lead-time is desirable to conduct heritage resources studies. Prescribed fires involving large areas (more than 1000 acres), in particular, should be planned far in advance (i.e., one year or more in advance) to allow the HRM to arrange personnel, develop inventory strategies, consider opportunities for

controlled experiments, and schedules to conduct any necessary fieldwork. Sufficient time should be afforded to complete these procedures prior to NEPA document publication.

Some prescribed fires may be considered categorical exclusions that do not require extensive NEPA documentation and public review. However, categorical exclusion under NEPA does not eliminate the Forests' responsibilities under Section 106 of the NHPA. Therefore, the procedures described in this document or 36 CFR 800 must be followed for prescribed fires regardless of classification of the undertaking under NEPA.

### 4.1.2 Notification

Forest Service Fuels Management Specialists responsible for planning and implementing prescribed fires (Fuels Specialists) should, as soon as a prescribed fire is proposed and with as much lead time as possible, notify the Forest Heritage Resources Manager (HRM) of the proposed undertaking. Fuels Specialists should provide the HRM with information regarding the proposed fire, accompanied by a USGS 7.5 minute topographic quadrangle depicting:

- The boundaries of the area(s) proposed for burning;
- Projected variation in planned burn intensities within the fire area;
- Areas of proposed or potential ground disturbance (e.g., unpaved access roads, fire breaks, fire camps if any).

## 4.2 HERITAGE RESOURCES IDENTIFICATION

### 4.2.1 Assessing Information Needs

HRMs should conduct sufficient background research to determine the kinds of resources known or suspected to exist within the proposed fire area(s). The objective of this background research is a list of *heritage resources of interest* that may exist within the proposed fire area that may be substantially affected by the proposed fire. The following steps should be taken to assess information needs:

**Conduct Background Research.** Background research provides the basis for determining the nature of the resources that will be sought out and considered. A variety of information sources may be available for an area proposed for prescribed fire, although not all sources of information may be necessary for decision-making on each and every fire. Pre-fire research may include the following:

- Examination of heritage resource base maps and inventory files to compile a list of known resources and resource types that can be expected within the fire area;

- Examination of records of land use history (e.g., mining claims, homestead claims, stand record cards, grazing histories, historical accounts);

- Forest Service fire records, paleoenvironmental studies (e.g. dendro-chronological records, soil studies);

- Cultural resources survey, if little or nothing is known about the proposed fire area, to collect information to develop inventory strategies; and

- Native American consultation, as appropriate, to identify concerns regarding the burning of resources or resource areas of special importance. Prescribed fires either may destroy, or present opportunities to enhance, certain plant resources used by Native Americans, if coordinated to ensure proper timing and intensity.

### 4.2.2 Identifying Heritage Resources of Interest

Heritage resources of interest are classes of resources that: (1) have some potential to be important (e.g., eligible for the National Register of Historic Places); and (2) the important characteristics of the class of resources have a reasonable potential to be substantially damaged or destroyed by the nature of the fire that is proposed. The term Asubstantially damaged@ is ambiguous but is used purposefully. This module is based on the belief that the benefits of prescribed fires to heritage resources management outweigh possible (though sometimes ambiguous) effects. Professional judgment can play an important role in identifying heritage resources of interest, particularly when the effects of fire on certain types of archaeological materials are poorly understood (e.g., the effects of low-intensity fire on surface obsidian).

Resources of interest within prescribed fire areas will always include historic, above-ground wooden features (e.g., cabins, corrals, fences, flumes, trestles, historic power poles, logging chutes, bow stave trees). Some types of wooden heritage resources may not be recognized by heritage resource professionals. Bow stave trees and wooden mortars fashioned into downed trees are examples of resources that, until recently, were not widely known to exist by professionals. These types of resources may fall victim to prescribed fires if not recognized. However, prescribed fires usually are not designed to consume trees and large wooden objects but clear the ground surface of grasses, shrubs and accumulated dead fuel. Prescribed fires are less likely to destroy wooden features and artifacts than wildfires supported by unmanaged fuel loads. Nonetheless, the potential for damage to such resources must be acknowledged.

Depending on the intensity of the proposed fire and other variables, some resource types may be considered resources of interest even if such resource types are not susceptible to substantial damage from fire itself. Such considerations include proximity to public roads, existing public knowledge of the site(s), and visibility of archaeological deposits. For example, if a prehistoric site is well known to local artifact collectors but the site has been protected from

vandalism by heavy shrubs or blackberry thickets, then prescribed fire may expose the site to vandalism and it should be a resource of interest.

Identifying resources of interest is an extremely important step, because it predicates the need for, and type of subsequent identification, evaluation, and management efforts. Resources of interest can be so inclusive that close-transect archaeological survey is necessary to identify such resources, or so exclusive that no field survey is necessary.

### 4.2.3 Developing a Heritage Resources Plan for Prescribed Fires

A Heritage Resources Plan shall guide heritage resources studies and management for each prescribed fire for Prescribed Fires (Plan). The Plan may be brief, but it must address a number of topics. At a minimum it should describe:

(1) The proposed burn area and descriptive information provided by the Fuels Specialist (e.g., intensity, methods, areas of ground disturbance, scheduling, etc.);

(2) The sources of information consulted in assessing information needs;

(3) A list of resources of interest accompanied by a brief rational for their listing, either individually or by resource class;

(4) Appropriate methods proposed for identifying resources of interest;

(5) Areas that may contain resources of interest, but ground cover conditions preclude their identification, to the extent possible prior to the survey;

(6) Recommendations for post-fire survey in terms of location, acreage, or percentage of specific areas or environmental zones;

(7) If the circumstances of prescribed fires present opportunities to conduct research or experimentation, a research element should be seriously considered in the Plan; and

(8) An estimate, in labor hours or dollars, of the cost to complete the heritage resources identification work, experiment (if any), and post-fire survey.

Information presented in the Plan will provide the basic description of methods for the subsequent inventory report, so the effort to develop the Plan will pay off later in the management process.

### 4.2.4 Locating Heritage Resources of Interest

**Methods.** Methods for locating heritage resources of interest should be appropriate to the nature and visibility of the resource classes. AWindshield@ surveys, broad transect surveys, or

use of aerial photographs may be appropriate for the identification of certain aboveground resources (e.g., cabins, fences, power poles). Selective examination of surface features may be appropriate to other classes, such as the examination of rock outcrops in areas known to contain rock art. If midden sites are listed as resources of interest, then close-spaced transect survey within certain environmental contexts may be necessary to identify those types of sites. The methods selected for identification efforts, and the rationale for these methods, should be documented in the Identification Plan.

All areas of proposed ground disturbance shall be surveyed (e.g., fire lines, new access roads, helispots, and fire camps if any). New fire line areas shall be surveyed in all previously unsurveyed areas. If any heritage resources are identified within firelines, the firelines should be reconfigured to avoid those properties if possible. If reconfiguration and avoidance is not possible, then heritage resources within the proposed fireline area shall be evaluated pursuant to this document. Existing firelines need not be surveyed where rehabilitation of the fireline is accomplished by clearing duff with garden rakes and removing overhanging branches by hand.

**Deferred Inventory.** At the discretion of the HRM, field survey may be deferred for areas of impenetrable brush and ground-obscuring vegetation that prevents the identification of resources of interest. These areas may be selectively examined after the prescribed fire, when ground visibility has improved. The criteria and methods for deferred inventory are described in Section 5 of this Prescribed Fire Module.

**Records.** Heritage resources of interest shall be documented on California Department of Parks and Recreation Form 523 (DPR 523) in accordance with *Instructions for Recording Historical Resources* (Office of Historic Preservation 1995).

**Incidental Discoveries.** If heritage resources that are not resources of interest are incidentally discovered during field survey, those resources shall, at a minimum, be recorded on Primary forms (see items c and d above). Detailed descriptive subforms are not necessary for the purposes of the prescribed fire.

### 4.3 HERITAGE RESOURCES EVALUATION

Heritage resources of interest within prescribed burn areas must be evaluated pursuant to 36 CFR 800.4(c) unless protective or avoidance measures are taken to ensure that no harm comes to those resources. The HRM shall work with the Fuels Specialist to determine the feasibility and likely effectiveness of proposed avoidance and protection measures. Standard protection measures are described in Attachment 1 of this document. The Forest Service shall evaluate all heritage resources of interest that cannot or will not be avoided or protected.

Heritage resources that are not resources of interest need not be evaluated, since it is assumed that such resources will not be substantially damaged by prescribed fire or are inherently unimportant (i.e., isolated artifacts)

### 4.3.1 Linear Resources

Linear resources that are considered resources of interest (e.g., wooden flume systems) that the Forest Service determines are impractical to avoid or protect shall be evaluated to the extent necessary to determine whether the resources within the prescribed burn area are contributing elements to an historic property. If a Forest cannot or proposes not to evaluate all of a linear resource, the Forest shall consult with the State Historic Preservation Office (SHPO) to determine the appropriate extent of resource evaluation.

## 4.4 PROTECTION AND TREATMENT OF HERITAGE RESOURCES

### 4.4.1 When No Resources of Interest Are Found

Heritage resources that are not resources of interest need no special protection or treatment measures. Heritage resources that are determined not to be resources of interest are either not susceptible to damage resulting from prescribed fire (e.g., bedrock milling features), or such resources have been determined to be ineligible for the National Register of Historic Places and are not worthy of protection. If no resources of interest are located within the APE of the prescribed fire, the Forest may proceed with the prescribed fire without further consideration to heritage resources or SHPO consultation. However, the Forests must document the information- gathering and inventory effort pursuant to Section 4.2.4 and 4.5 of this Prescribed Fire Module, incorporating such documentation (or summary) into NEPA documentation. Reporting of the heritage resources inventory process shall provide the information listed in Section 5.0 of this Prescribed Fire Module, and shall meet the requirements of the Annual Report set forth in Stipulation XII of the Sierra PA.

**4.4.2 When Heritage Resources of Interest Are Present.** When heritage resources of interest are present within the APE, the Forests must choose one of three alternatives, according to specific circumstances.

**When Protection Is Possible and Desirable.** Heritage resources of interest that have been determined eligible for the National Register of Historic Places, or unevaluated heritage resources of interest, may be protected from damage through the application of specific protective measures described in this Prescribed Fire Module. Protection and avoidance measures ensure that the known and potential cultural values associated with those resources of interest are not substantially degraded by prescribed fire and associated activities. Standard protection and avoidance procedures are described in Attachment 1 of this document.

Evaluation and Consultation. A Forest may implement a prescribed burn without evaluating heritage resources of interest and without pre-fire SHPO consultation when heritage resources

of interest within the fire area are protected from damage with standard protection measures. If a Forest chooses an alternative form of protection not listed in Attachment 1, the Forest shall consult with the SHPO prior to the prescribed fire. The SHPO may recommend additional measures or determine that further consultation pursuant to process.

Reporting. The heritage resources inventory process, resource evaluations if and protective measures selected for the heritage resources, shall be described in a report that meets the information requirements of Section 5.0 of this Prescribed Fire Module, incorporating such documentation (or summary) into NEPA documentation. Reporting of the heritage resources inventory process shall also conform to the requirements of the Annual Report set forth in Stipulation XII of the Sierra PA.

**When Heritage Resources Will Not Be Protected.** The Forest Service may determine that the protection of heritage resources of interest is infeasible or undesirable for any of a number of reasons, including a perception that the resource(s) have little cultural values, because protective measures are costly, or because heritage resources cannot be confidently protected. Evaluation. If the Forests cannot or chooses not to protect heritage resources of interest, the Forests must evaluate those resources by applying the National Register of Historic Places criteria for eligibility described at 36 CFR 60.4, or apply alternative evaluation criteria accepted by the SHPO and Advisory Council under the terms of an agreement document (e.g., FARM criteria for determining cultural values, as ratified by the Sierra PA).

Consultation. If evaluation determines that heritage resources of interest are NRHP eligible or retain moderate to high cultural values, and the Forest determines that it cannot protect those resources by applying the standard protection measures described in Attachment 1 , then the Forests shall determine the nature of the effect that the undertaking may have on historic properties by applying the Criteria of Effect and Adverse Effect set forth at 36 CFR 800, prior to a decision or action on a prescribed fire subject to consideration.

## 4.5 POST-FIRE INVENTORY AND MONITORING

### 4.5.1 Post-Fire Inventory

**Objectives.** Post-fire inventory is an important requirement of these procedures, and can accomplish four objectives:

- provide inventories of lands previously inaccessible due to dense brush and vegetation;
- monitor the effectiveness of pre-fire archaeological survey(s);
- increase heritage resources inventories of the Forests, providing more comprehensive management and research information; and

- advance Forests' compliance with the requirements of Section 110(a)(2) of the NHPA.

**Methods.** Forests shall conduct post-fire field surveys of a minimum of 20 percent of vegetated lands within prescribed fire areas. The HRM shall use discretion and professional judgment to select the specific areas and methods for post-fire survey according to the specific circumstances of the proposed fire area and with consideration to the maximum management benefit to heritage resources. The choice of, and rationale for, selecting post-fire survey areas and methods of inventory shall be included in Identification Plans prepared prior to the fires.

Criteria for Sample Inventory. At the discretion of the HRM, post-fire survey may be directed to any combination of the following:

- previously unsurveyed lands within the prescribed fire area;
- areas that were previously surveyed under pre-burn conditions (as a cross-check on past survey methods and quality);
- samples of various vegetation zones or biotic communities; or
- selective survey of areas suspected to contain heritage resources.

*Scheduling*. Post-fire survey should be conducted within two months of the fire, particularly if the fire occurs in the fall or early winter, and rains are anticipated soon. Scheduling is important for post-fire survey, and should target periods and conditions of maximum ground visibility (e.g., after the first post-fire rain or substantial wind that exposes mineral soils, and before new vegetation obscures the ground surface). An alternative schedule may be arranged, as long as survey is scheduled to take advantage of maximum post-fire ground visibility conditions.

*Slope*. Slopes exceeding 30 percent may be excluded from the inventory sample, but if so, those areas should not be included in the total acreage for the purpose of calculating 20 percent post-fire survey coverage.

*Ground Cover*. Usually, no more than 60 percent of ground cover vegetation is consumed by prescribed fire to expose mineral soils. Post-fire survey may exclude areas in which ground visibility remains obscured, although the 20 percent post-fire survey requirement shall be calculated by including the acreage of such obscured areas. If it is not possible to determine ground visibility conditions prior to field survey, the Identification Plan should accommodate in-field flexibility to redesign survey strategies in light of discovered ground conditions, ensuring that the appropriate expertise and authority is available for such decision-making (e.g., a district Heritage Resource Specialist).

*Reporting*. The results of post-fire survey shall be reported in Heritage Resource Reports prepared for each prescribed fire.

Excerpts From:

# PROGRAMMATIC AGREEMENT
# AMONG
# WRANGELL-ST. ELIAS NATIONAL PARK AND PRESERVE,
# YUKON-CHARLEY RIVERS NATIONAL PRESERVE,
# GATES OF THE ARCTIC NATIONAL PARK AND PRESERVE,
# THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND
# THE ALASKA STATE HISTORIC PRESERVATION OFFICER
# REGARDING IMPLEMENTATION OF THE FIRE MANAGEMENT PLAN AND
# SECTION 106 COMPLIANCE

## Preface

A fire management plan was developed for Yukon-Charley Rivers National Preserve (YUCH) by the park's Fire Management Officer (FMO) with assistance from specialists on the park staff. Implemented in 2000, these plans divide the parks into several Fire Management Units (FMUs), each with a predetermined protection category that will guide fire management strategies in the event of a wildland fire. Factors taken into consideration during the creation of the FMUs include the presence of permanent residences and National Historic Landmark properties, as well as the presence of fire-dependent ecosystems, among others. FMU designations in and of themselves create the potential for adverse effects to cultural resources. In order to minimize possible negative impacts to significant cultural resources, additional protection statuses have been defined that, when applied to individual properties, will supplement the FMU designations and subsequent response strategies during a wildland fire. These protection statuses (see Appendix 3) are assigned to individual cultural resources based on: (1) the property's National Register status and eligibility; (2) the importance of the property to the management goals of the park unit; (3) the integrity of the property; and (4) the property's contribution to established park specific cultural and historic themes. Using these same workbooks, FMPs for Gates of the Arctic National Park and Preserve (GAAR) and Wrangell-St. Elias National Park and Preserve (WRST) will be prepared by Spring 2002.

Because the protection of every cultural resource within the Parks is not possible, potential adverse effects to individual properties need to be resolved. This task is difficult in that all of the factors that may affect resources are speculations, dependent upon a host of variables. Implementation of the FMP necessitates not only identifying and evaluating all cultural resources that have the potential to be impacted by wildland fire or fire suppression activities, but also mitigating adverse effects that may impact these resources. It is the purpose of this Programmatic Agreement to specify the terms by which the Parks' Fire Management Programs will fulfill their obligations under Section 106 and Section 110(f) of the National Historic Preservation Act of 1966, as amended (NHPA).

**STIPULATIONS**

I. This Agreement specifically applies to the FMPs with regard to wildland fires and their potential impacts on historic properties. Any prescribed burn carried out in the Parks will be treated as an individual undertaking and will be subject to consultation pursuant to 36 CFR Part 800.

II. Archaeological sites consisting solely of subsurface remains are not subject to further review under this Agreement based on the fact that they have a low potential to be adversely affected by wildland fires, and because most have presumably experienced burn over by wildland fires sometime in the past. Similarly, sites that are constructed of or consist solely of noncombustible materials, such as stone or iron, are also not subject to further review.

YUCH, WRST and GAAR will ensure that the following measures are carried out:

III. INVENTORY, EVALUATION AND DETERMINATION OF EFFECT

A. The Parks will ensure the completion of an inventory of known cultural resources within the area of potential effect (APE) within each park unit. The APE defined in this Agreement is the total acreage in the Parks containing sufficient fuel to support a wildland fire. The inventory process will follow the standards and workbooks specified in Appendix 1 and in the Secretary of the Interior's Standards and Workbooks for Archeology and Historic Preservation (48 FR 44716).

B. The Parks, in consultation with the SHPO, will follow the procedures described in 36 CFR 800.4(c) to evaluate the historical significance for all historic properties within the APE. Furthermore, the Parks shall seek comments from all potentially interested Alaska Native groups pursuant to National Register Bulletin 38 in order to identify potential Traditional Cultural Properties located within the APE, and will then apply National Register criteria and evaluate the historical significance of those properties identified. Copies of all determinations of eligibility will be submitted to the SHPO for concurrence.

C. The Parks will evaluate all inventoried cultural resources using the Fire Protection Status criteria defined in Appendix 1. Additionally, the Parks will compile a complete list of all known cultural resources, sorted by fire protection status and including locational information, to be used by the FMO in the event of a wildland fire.

D. The Parks will identify the adverse effects having the potential to impact historic properties based upon their Fire Protection Status. A list of potential adverse effects is found in Appendix 1. The Parks will then apply the Criteria of Adverse Effect 36 CFR 800.5(a) to all properties determined eligible for inclusion in the National Register pursuant to Stipulation IV(B).

IV. IMPLEMENTATION OF A TREATMENT PLAN

A. The Parks, in consultation with SHPO, shall ensure that a treatment plan is developed for the mitigation of anticipated adverse effects on historic properties that will result from implementation of the Fire Management Plan with regard to wildland fire activities.

B. The Treatment Plan shall be consistent with the Secretary of the Interior's Standards and Workbooks for Archaeology and Historic Preservation (48 FR 44716) and any applicable regulations and guidance of the National Park Service or YUCH/WRST/GAAR in particular.

C. The Treatment Plan shall specify the minimum measures to be taken to resolve the potential adverse effects on historic properties by fire management status. These measures will serve to fulfill the Parks' obligations under Section 106 of the NHPA.

D. Historic properties that are classified as Non-sensitive or Non-sensitive/Defensible Space have the potential to be eligible for the National Register based solely on Criterion D: Information Potential. In this instance, YUCH, WRST, and/or GAAR will consult with SHPO on a property-by-property basis, and will develop appropriate individual treatment plans in order to mitigate potential impacts to these properties.

V. PUBLIC NOTIFICATION AND INVOLVEMENT

A. In accordance with Section 101(d)(6)(b) of the National Historic Preservation Act, the Parks shall consult with appropriate local Alaska Native tribal organizations concerning the presence of properties that have religious or cultural significance and are located within the APE. Consultation shall be initiated in writing, followed by telephone contact, and in-person visits if desired by the local tribal entity. To the extent possible, this consultation will be initiated prior to any other public involvement procedures, in order to identify and resolve potential concerns about the confidentiality of information on historic properties. If a tribe requests that information be kept confidential, the Parks will use the authority of Section 9 of the Archaeological Resources Protection Act and Section 304 of the NHPA to withhold such information from the public.

B. Initial notification will be made to communities in the form of a letter or documented phone conversation to the appropriate public entity. Public involvement in the form of a public meeting will occur in communities that specify an interest in the fire management plan and its potential effects on historic properties and request a meeting, as specified in 36 CFR 800.3(c). These communities may include: Anaktuvuk Pass, Bettles, Wiseman, Nabesna, Mentasta, Chistochina, Gulkana, Tazlina, Slana, Copper Center, Chitina, McCarthy, Northway Junction, Yakutat, Circle, Central, and Eagle.

**Appendix 1: Fire Management Plan Cultural Resource Workbooks**

(from the Fire Management Plan for Yukon-Charley Rivers National Preserve, October 2000)

**I. Identification of Historic Properties**:

A. Known Historic Properties

1. Based on background research, it is estimated that 90% of all historic properties consisting of above ground structural remains have been identified in the Parks. A master list will be created of these known historic properties located within the area of potential effect (APE), defined herein as the total acreage in the Parks containing sufficient fuel to support a wildland fire. Sources to be used in compiling this list include: the NPS List of Classified Structures (LCS), the NPS Cabin Database, Alaska Heritage Resource Survey (AHRS) files, NPS Historic Resource Study base maps and documentation (Grauman 1977), and NPS Cultural Resources Mining Inventory and Monitoring Program (CRMIM) files.
2. In creating this list of historic properties, sites that have been determined either eligible or ineligible for the National Resister will be noted. The site files for those cultural resources that have not had determinations of eligibility (DOEs) completed will be assessed for both completeness of information and recentness of documentation (see the evaluation process below).

B. Unknown Historic Properties

For the remaining estimated 10% of historic properties that have yet to be identified, no systematic survey will be carried out as a result of this Programmatic Agreement. Instead, future historic properties will be inventoried and evaluated upon their discovery, using the same process and specifications described below.

**II. Evaluate Historic Properties**—The FIRE protection status assigned to each historic property is dependent upon the property's National Register status (see Appendix 3). As such, each known property must be evaluated and found either eligible or ineligible for inclusion in the National Register. Those properties that have been identified as not having had a DOE during the inventory process will require the preparation of a DOE. Additionally, those properties that have been found eligible, but were determined as such more than five years previous to the current year, will need to be reassessed.

A. Determinations of Eligibility

1. DOEs will be prepared for those sites that have sufficient current information in their files to do so. This information includes:
   a.) a known location marked on a USGS map;
   b.) information on the significance (or lack thereof) of the historic property;
   c.) a detailed site map to scale;
   d.) a detailed description of each feature or structure found at the site including measurements, site condition descriptions, and plan maps;

e.) photographs that adequately represent the property; and
f.) the results of any subsurface testing, if applicable (for those historic properties that are nominated solely by Criterion D).

2. Those cultural resource files lacking sufficient data to assess eligibility for the National Register will require research and/or visitation and documentation by a qualified cultural resource specialist who meets the minimum standards set forth in the Secretary of the Interior's Professional Qualification Standards (48 FR 44738-9).
3. Determinations of eligibility or non-eligibility will be submitted to the SHPO for concurrence as specified in 36 CFR 800.4(c)2. Upon receipt of the DOEs, the SHPO will have 90 days to review and comment. If, after 90 days, the SHPO has not made comment, then the determinations made by the Parks will apply.

B. FIRE Protection Status Assessment—According to the FMP, every known cultural resource in the Parks will be categorized into one of four protection statuses, each of which prescribe the actions to be taken toward the resource by FIRE. These actions include both preventative measures, such as hazardous fuel reduction and monitoring, and suppression strategies to be carried out should a wildland fire threaten the property. Appendix 3 (this document) lists the Protection Status categories specified in the FMP, as well as general criteria used to designate the specific status. Some overlap exists in criteria for status designations. Each cultural resource will be assessed using the detailed, objective criteria described below.

1. Critical Protection Status:
   a.) any historic property designated as a National Historic Landmark.
   b.) any cabin or building that has been specified as actively occupied on a resident use permit granted to the user by the NPS.
   c.) any property that is essential to the Parks management and resource operations; examples include: ranger stations, remote base camps, etc.
2. Full Protection Status
   a.) any historic property designated, or determined eligible for, inclusion on the National Register that retains structural integrity (i.e., standing with a roof1).
   b.) any property that has received NPS funds for stabilization or rehabilitation, or is designated to receive funds in the future.
   c.) administrative sites (i.e., public use cabins, actively used airstrips, etc.).
   d.) cultural resources that are representative of historical themes established by the park unit and retain a high degree of structural integrity.
3. Non-sensitive/Defensible Space Protection Status
   a.) cultural resources that are not eligible for the National Register, but that are representative of historical themes established by the park unit and have a decrease in structural integrity.

1. The fire protection strategy for most historic properties will be portable sprinklers, which have a significant reduction in effectiveness on historic structures that do not have a roof or otherwise lack in structural integrity (M. Henderson, GAAR/WRST/YUCH FMO, personal communication).

b.) cultural resources that are in the process of assessment for the National Register.
c.) historic properties that have a decrease in structural integrity:
(i) stand-alone log buildings/structures with a collapsed roof
(ii) stand-alone frame buildings with a collapsed roof
(iii) stand-alone tent frames and other camp features (meat racks, fish wheels, sheds, outhouses, etc.) that are less than 75% intact
(iv) stand-alone mining features (adit, penstock, flume, dam, etc.) that are less than 75% intact
(v) multi-Element properties in which the majority of the contributing structures are less than 75% intact
(vi) bridges, trestles, aerial tramways, or other transportation-related features that are less than 75% intact

4. Non-sensitive Protection Status
a.) trespass structures that do not meet any of the criteria listed above.
b.) cultural resources that are not eligible for the National Register.
c.) historic properties that lack significant structural integrity:
(i) stand-alone log buildings/structures that consist of four courses of logs or less
(ii) stand-alone frame buildings with one or more collapsed wall(s)
(iii) stand-alone tent frames and other camp features (meat racks, fish wheels, etc.) that are less than 50% intact
(iv) stand-alone mining features (adit, penstock, flume, dam, etc.) that are less than 50% intact
(v) multi-Element properties in which the majority of the contributing structures are less than 50% intact
(vi) bridges, trestles, aerial tramways, or other transportation-related features that are less than 50% intact
(vii) machinery, vehicles, or other equipment that has degraded to the extent that function and/or interpretive value has been compromised

**III. Identify and Assess Adverse Effects**—A variety of adverse effects have the potential to affect historic properties as a result of fire protection status evaluation. Historic properties that are afforded Critical, Full, or Non-sensitive/Defensible Space status will be placed on a rotation of scheduled hazardous fuel reduction (HFR) and will be afforded other preventative measures. Full and Critical status properties will be outfitted with portable sprinklers should they be threatened by a wildland fire. Properties that are designated Non-sensitive and Non-sensitive/Defensible Space will not receive fire suppression protection.

A. Potential Adverse Effects
1. Wildland fire: All historic properties located in the APE have the potential to be affected by a wildland fire. Properties that are classified as Critical will be vigorously protected using a variety of fire suppression techniques. Properties that are

classified as Full will be afforded less fire suppression protection. Properties that are Non-sensitive and Non-sensitive Defensible Space will not receive suppression protection in the event of a wildland fire.

2. Wildland Fire Suppression/Structure Protection:
   a.) Water Suppression/Protection Techniques
      (i) Bucket Drops: Although remote, bucket drops may affect historic sites during wildland fire management. Possible adverse effects include: collapse of historic properties due to the impact of water, collapse as a result of water saturation, or water damage to the resource.
      (ii) Sprinklers: Sprinklers are used as a preventative measure when a wildland fire has the potential to overcome a building or structure. The sprinkler is attached to the building and water from a nearby source is pumped through the system until the threat of fire is past, providing a constant shower over the property to be protected. Possible adverse effects of using the sprinkler include water saturation and collapse, and water damage.
   b.) Fire Line or Saw Line: When fighting a wildland fire, one strategy is to create a break between the fire and the area to be protected. Fire lines are constructed when fires are concentrated in the understory or on the ground. They usually average 12" wide and are dug to mineral soil, in an effort to remove fuel such as lichens, sphagnum, or grasses. Saw lines are cut when wildland fire is concentrated in the crowns of trees and understory, and consist of the removal of trees and brush from an area that's width is 1½ the height of the surrounding overstory. Adverse effects include the possible surface disturbance of features as a result of a dig line and/or dragging brush across the ground surface, or damage from falling trees.
   c.) Backburn: Backburn is the act of lighting a fire between the area to be protected and the wildland fire in an attempt to remove the potential fuel load in the wildland fire's path. The possible adverse effect of a backburn is losing control of the burn, or lighting a burn over and through a historic property of a lesser Fire Protection Status to save another.
   d.) Wrapping: Many standing structures are protected by using "cabin wrap," a metallic material that is attached to the structure with staples to create a nonflammable barrier. Potential adverse effects include inadvertent destruction when attaching and/or removing the cabin wrap.
3. Hazardous Fuel Reduction: Hazardous fuel reduction is a preventative technique that consists of reducing the potential fuel load around buildings or structures.
   a. Brush Cutting: The removal of alder, willow, or other thick brush from within a 30-foot radius around the property to be protected using hand tools. The possible adverse effect of brush removal consists of branches falling on structures, dragging the brush across features, and/or creating brush piles on top of features.
   b. Tree Falling: The removal of large trees, including spruce, birch, aspen, etc. from

within a 30-foot radius around the property to be protected using hand tools and/or a chain saw. The primary potential adverse effect is trees falling onto the structure or other features.

c. Removal of Fuel: Once the brush and/or trees have been reduced, the subsequent piles need to be removed. Frequently, the brush/log piles are burned and monitored by FIRE staff. Occasionally, trees are cut into logs to be used as firewood at Public Use Cabins, which requires the logs to be transported from the area of removal, usually by helicopter.

4. Benign Neglect: Benign neglect is the process of allowing a building or structure to naturally deteriorate.

B. Adverse Effects by Fire Protection Status

| .5.1.1 Critical | .5.1.2 Full |
|---|---|
| wildland fire | wildland fire |
| wildland fire suppression | wildland fire suppression |
| hazardous fuel reduction | hazardous fuel reduction |
| | |
| .5.1.3 Non-sensitive/Defensible Space | .5.1.4 Non-sensitive |
| wildland fire | wildland fire |
| hazardous fuel reduction | benign neglect |
| benign neglect | |

## Appendix 2. Treatment Plan for Adverse Effects

(from the Fire Management Plan for Yukon-Charley Rivers National Preserve, October 2000)

Implementation of the Fire Management Plan at the Parks is unique in that the mitigation of one adverse effect, such as wildland fire, necessitates the mitigation of potential hazards caused by the mitigatory procedures themselves. As a result, the treatment plan for adverse effects consists of a tiered system whereby one action requires the execution of several other actions. A further consideration is the fact that all of the adverse effects identified as impacting cultural resources are implicit as opposed to explicit. Therefore, it is possible that none of the adverse effects identified in Appendix 1 will affect any of the cultural resources located in WRST or YUCH. Nevertheless, actions should be taken to ensure that historic properties are documented to their full extent, in preparation for future wildland fires.

The following Treatment Plan specifies the requirements necessary to mitigate the potential adverse effects to historic properties in the Parks, in order to satisfy Section 106 responsibilities with regard to implementation of the FMP. The requirements are fire protection status specific, based both on the integrity of the property and the variability of potential adverse effects.

### I. Critical

Properties that are designated as Critical will receive the highest priority for protection by Fire Management Personnel, resulting in an immediate and continuing aggressive attack on the wildland fire. Only threats to firefighter safety or the lack of fire suppression means due to an increased need elsewhere (e.g., if efforts had to be focused on a threatened population center) would result in an abatement of suppression for Critical status properties. As a result of this intensive level of protection, Critical properties have less potential to be affected by wildland fire but may be impacted by firefighting efforts.

The following measures will be taken to mitigate potential adverse effects to Critical Historic Properties:

1. **National Register Nomination:** Nominations shall be prepared for all identified historic

properties that are designated Critical but are not yet listed on the National Register, using the workbooks designated in National Register Bulletin 16.

2. **Historic Structure Report:** An Historic Structure Report (HSR) shall be prepared for all Critical historic resources. An HSR is a primary guide used for managing historic resources by the National Park Service. Following a predefined format, the HSR documents the developmental history of a structure and is used in creating a treatment and use plan for the structure as applicable to park management and planning policies.
3. **Individual Site Preparedness/Protection Plan:** Individual Site Preparedness/Protection Plans (ISP Plan) define strategies and actions to be taken by FIRE to protect Critical and Full Status properties. The ISP Plan defines the work to be completed to create defensible space, lists the equipment needed to protect the property, and establishes a schedule of maintenance to be carried out to ensure adequate protection. Individual Site Preparedness/Protection Plans will be prepared by FIRE staff in consultation with the FMO and appropriate cultural resource staff for all Critical historic properties.

II. Full

A property that is designated as Full may receive less attention than a Critical property in the event of a wildland fire. The primary protection strategy will be to conduct an aggressive initial attack on the wildland fire, with additional fire suppression and protection strategies dependent upon the availability of resources and the individual site preparedness/protection plans. Because firefighting resources will be concentrated on Critical sites, Full properties have a greater potential to be impacted by both the wildland fire itself and various fire suppression strategies.

The following measures will be taken to mitigate potential adverse effects to Full Historic Properties:

1. **Historical Documentation:** Historical documentation is defined by National Park Service workbooks as a detailed record of the significance of a property for research and interpretive purposes and for conservation of information in cases of threatened property destruction (NPS 1983, p. 44728). As specified in the Secretary of the Interior's Standards and Workbooks for Archaeology and Historic Preservation (48 FR 44716), historic documentation incorporates, rather than duplicates, previous research with additional intensive research using sources such as archives, oral histories, primary and secondary literature, ethnohistories, etc. Historical documentation will be carried by the Parks for all historic properties designated as Full, and will include architectural documentation following the standards set forth by the National Park Service's List of Classified Structures (LCS) program.

2. **National Register Nomination:** National Register nominations will be prepared on a scheduled basis for all Full historic properties. The schedule for nominations will be prepared once the inventory and evaluation phase is accomplished. Nominations for Full status properties will occur after nominations for Critical status properties have been completed.

3. **Individual Site Preparedness/Protection Plan:** Individual Site Preparedness/Protection Plans (see Critical above) will be prepared by FIRE staff in consultation with the FMO and appropriate cultural resource staff for all Full historic properties.

III. Non-Sensitive and Non-sensitive/Defensible Space

Wildland fires that threaten historic properties designated as Non-Sensitive and Non-sensitive/Defensible Space will be allowed to burn under the influence of natural forces. Therefore, historic properties in this category do not have the potential to be affected by fire suppression measures, but have a high potential for destruction as a result of fire. In an effort to minimize the potential threat of fire, defensible space will be established around each historic property designated Non-sensitive/Defensible Space; no actions will be taken to protect Non-sensitive designated historic properties.

The following measures will be taken to mitigate potential adverse effects to Non-Sensitive and Non-sensitive/Defensible Space Historic Properties:

1. **Historical Documentation:** Historical documentation (see Full above) will be carried by the Parks for all historic properties designated as Non-sensitive/Defensible Space.

2. **National Register Nomination:** National Register nominations will be prepared on a scheduled basis for all Non-sensitive/Defensible Space historic properties. The schedule for nominations will be prepared once the inventory and evaluation phase is accomplished. Nominations for Non-sensitive/Defensible Space status properties will occur after nominations for Critical and Full status properties have been completed.

## Appendix 3. FIRE Protection Status Criteria

(from the Fire Management Plan for Yukon-Charley Rivers National Preserve, October 2000)

Because the protection of every known cabin site within the preserve is not feasible, criteria have been established to provide cultural resource specialists and park management with a sound methodology for determining which key sites will be afforded special protections from wildland fire. The criteria are as follows and may be updated or improved upon should new information come to light.

**CRITICAL:**

*Definition: Fires occurring immediately threatening this designation will receive highest priority for protection from wildland fires by immediate and continuing aggressive actions dependent upon the availability of suppression resources.*

Objectives: Protect human life, inhabited property and designated physical developments without compromising fire fighter safety. Protection of the aforementioned elements is the primary objective, not control of the wildland fire.

Recommended criteria:

1. Year-round residence.
2. Structural resources designated as National Historic Landmarks.

**FULL:**

*Definition: Fires occurring immediately threatening this designation will receive aggressive initial attack dependent upon the availability of suppression resources.*

Objectives: Protect sites designated as Full management from the spread of wildland fires burning in a lower priority management option. Minimize damage from wildland fires to the resources identified for protection commensurate with values at risk.

Recommended criteria:

1. *Structural resources designated or eligible for inclusion on the National Register of Historic Places.*
2. Structural resources that have received NPS funds for rehabilitation or restoration.
3. Structural resources vital to the NPS mission, i.e. administrative sites.
4. Structural resources with a high degree of structural integrity that are also representative of historic themes established by the Preserve.

**NON-SENSITIVE:**

*Definition: Fires occurring immediately threatening this designation will be allowed to burn under the influence of natural forces within predetermined areas while continuing protection of human*

*life. Generally this designation receives the lowest priority for allocations of initial attack resources.*

Objectives: Within land manager policy constraints, accomplish land and resource management objectives through the use of wildland fire. Reduce overall suppression costs through minimum resource commitment without compromising firefighter safety. Use low impact suppression tools and tactics whenever possible. Ensure that suppression costs and associated environmental impacts of suppression actions are commensurate with the potential damage to values to be protected.

Recommended criteria:

1. Trespass structures.
2. Abandoned structures that are not eligible for inclusion on the National Register of Historic Places.

**NON-SENSITIVE/DEFENSIBLE SPACE:**

*Definition: Fires occurring immediately threatening this designation will be allowed to burn under the influence of natural forces within predetermined areas while continuing protection of human life. Defensible space will be built prior to any fire starts.*

Objectives: Within land manager policy constraints, accomplish land and resource management objectives through the use of wildland fire. Allow protection of structural resources using minimum tool and ensuring firefighter safety.

Recommended criteria:

1. Structural resources considered important to the historical theme of the Preserve but not vital.
2. Structural resources being assessed for eligibility into the National Register of Historic Places.
3. Structural resources that have been found eligible for the National Register of Historic Places, but which have been left to benign neglect by the NPS with no future plans to commit money for restoration or rehabilitation.

## ATTACHMENT 3. TREATMENT MEASURES

This section provides a series of treatment measures from which agencies can choose for their CREs as standard measures for cultural resource protection. These treatment measures may also be modified or supplemented in order to meet agency or individual preferences. As such, the following list of treatment measures may be used selectively or in their entirety, as appropriate to agency unit needs and procedures

The following list of treatment measures is by no means exhaustive. Some of these measures (e.g., hand lines surrounding resources) are designed to provide complete, short-term protection of cultural resources (e.g., avoidance). There are many circumstances where total avoidance is necessary and appropriate. However, total avoidance may have consequences such as the creation of "islands' of unburned vegetation that signals unauthorized artifact collecting or vandalism. Additionally, avoidance may do little more than defer a wildland fire that eventually damages or destroys the resource.

Seifkin (2001) classifies protective measures for cultural resources into two categories—exclusionary and non-exclusionary.

> Exclusionary tactics involve preventing fire from burning on or in close proximity to a cultural resource through the use of some predetermined fire management action such as a fire line, sprinkler system, or intentionally burning out the perimeter of a resource. Exclusionary tactics are often employed when it is anticipated, given expected fire behavior, that the fire will burn at an intensity that exceeds the threshold above which a particular resource or resource attribute is impacted (e.g., ~100° C for obsidian hydration rinds). Other examples of exclusionary techniques that have been employed with success include fire shelters, fire retardants, hand and mechanical fuel removal, and fuel burial.
>
> Non-exclusionary tactics make no attempt to exclude fire from a resource of interest, but instead seek to produce fire intensities below that expected to cause resource damage and/or that will not lead to future indirect effects. Common non-exclusionary approaches to resource protection include hand and mechanical fuel load reduction, burning under favorable prescriptions, and removal of vulnerable resources.

Some of the treatment measures in the following pages are designed to minimize the risk of substantial damage to resources while allowing fire or fire management activities at cultural resource locations. Treatment measures that allow some fire management activities to take place at cultural resource locations may pose greater short-term risk than total avoidance. However, facilitating certain fire management objectives such as fuels reduction may facilitate long-term preservation of cultural resources.

The use of treatment measures briefly described below should be accompanied by specific methods or parameter for their application that maximize cultural resource protection. Agencies and SHPOs/THPOs should reach agreement on how each of these treatment measures will be applied.

**Flagging.** Cultural resources may be flagged under a variety of circumstances. Flagging, in and of itself, is not a protective measure. The actions that are prompted by the flagging constitute the treatment. The most common use of flagging is to identify an area within which

ground-disturbing activities and fire should be excluded.

**Buffer Zones**. Buffer zones surrounding cultural resources may be employed as a means to lessen the likelihood of inadvertent effects from fire management activities. Buffer zones may also ensure that the setting of cultural resources are preserved, although such protection may require a definitive study to determine the contributing elements of landscapes to those resources.

**Redesign**. Fuel management projects may be redesigned to exclude the area containing and surrounding the cultural resource(s). Redesign is obviously more appropriate to fuel reduction projects than it is for wildland fire suppression.

**Fire Lines or Firebreaks**. Cultural resources may be protected by creating firebreaks that eliminate and break the chain of fuels to resources. There are several types of fire lines, each with their own advantages and disadvantages. These include: natural fire lines; wet and retardant lines; scratch lines; undercut lines; hand lines; and cat lines. The advantages of one particular method over another will depend upon the type of fire management activity (e.g., fuels reduction versus fire suppression), fire behavior, and cultural resource variables.

**Sprinklers.** Sprinklers are used as a preventative measure. The sprinkler is attached to the building (or other cultural resource) and water from a nearby source is pumped through the system until the threat of fire is past, providing a constant shower over the property to be protected. Possible effects of using the sprinkler include water saturation and collapse, and water damage.

**Foam wetting agents (suppressants) and fire retardants**. Foam wetting agents, such as Silv-Ex Wildfire Foam Concentrate, and other Class A foaming agents, are considered fire suppressants applied either to fuels or the base of a flame. Foams may be applied to cultural resources and/or areas surrounding cultural resources to protect them from fire damage. Fire retardants are defined by Teie (1994:167) as "…a substance that, by chemical or physical action, reduces or slows combustion, thus slowing or retarding the rate of spread of the flame front. Most retardants are produced by combining water, several chemicals, and a coloring agent. The main chemical ingredient is a fertilizer."

**Back Burning and Ring Firing**. Back burning (i.e., purposely burning outside a main fire application) may be used to reduce fuels, thereby buffering cultural resources in order to protect them from either prescribed fires or wildland fires. Ring firing is a related method described by Teie (1994:478 as follows:

> This type of firing is used when you are trying to save a valuable resource like a structure, or a historic or archeological site. This method of firing isn't anchored by the fireline. It is designed to create an unburned island.

**Fire Fabric or Wraps**. Fire resistant fabric may be placed over combustible cultural resources to protect them from burning. Sometimes called "cabin wrap," this a metallic material is attached to the structure with staples to create a nonflammable barrier. Potential effects of fire fabric include inadvertent damage to the cultural resource when attaching and/or removing the wrap.

**Burial.** The heat effects of fire are generally minimal for even the most severe surface fires when objects are buried 10 cm or more. The burial of woody fuels or archaeological materials is best suited to spot locations, such as stumps, or well-defined features, such as outcrops, where

soils can be easily and totally remove without damage to underlying deposits.

**Thinning.** Thinning reduces stand density by removing fuels. Thinning actions may vary between firebreaks and areas surrounding firebreaks. Pre-commercial thinning involves hand thinning of smaller diameter materials. Commercial thinning, accomplished through timber sales, involves larger materials. Small fuels can be removed from a cultural resource, either to lower the intensity of fire as it crosses the resource, or exclude fire from all or parts of a resource. This removal may involve carrying or dragging dead and downed branches away from the site or fire sensitive resources, or using rakes or leaf blowers to remove smaller debris.

Once thinning is accomplished, the slash must be treated or disposed in some way, including piling the material so it can be burned. The actual piling of the material may be accomplished by hand or machine, where equipment such as dozers and small tractors will haul the material to piles. Slash is also pushed or dragged into windrows. Some slash may be "rough-piled" or "jackpot piled" where heavier concentrations of fuel are left where they fall and are burned on site. Disposal activities should ensure that cultural resources are not situated within the disposal areas. Several additional methods of fuel disposal are listed below.

**Lopping And Scattering** - Thinned areas may be "lopped" to reduce fuel slash heights and then broadcast burned. Lopping consists of cutting smaller branches off the main stem so the height of the slash layer is reduced, which in turn allows for a less intense fire if the are is broadcast burned.

**Crushing** - Crushing involves dragging a large drum with protruding spokes or spikes over the vegetation, effectively breaking the fuel into smaller pieces. Another form of crushing uses a "brush crusher" in which a piece of equipment similar to a "weed-whacker" is attached to a tractor. The "brush crusher" is able to reduce the height of vegetation from 4' to 6' down to 6" in height. Both of these pieces of equipment are pulled or transported by either rubber tire tractors, or rubber or metal track dozers. The "brush crusher" may operate on up to a 60% slope.

**Chipping** - In the chipping process, slash is forced through a chipping machine, reducing the larger pieces of slash to small chips that are spread over the site to be burned at a later date, or left on site to naturally decompose.

**Hydro-Ax And Agra-Ax** - The Hydro-ax and Agra-ax are large cutting tools attached to a "Bobcat" type tractor (see also Low-impact Logging Equipment, below). They are used in the pinyon/juniper type, cutting trees off at the ground level. The trees are usually left to lay where they fall, assisting in soil retention.

**Broadcast Burning** - Broadcast burning uses fire over a designated area to consume natural or activity slash that has not been piled or windrowed. Broadcast burning may be used separately or in conjunction with mechanical methods such as thinning. Broadcast burns may be ignited by hand, by "terra-torches", torches mounted on 4-wheelers or on a flatbed truck, or with aerial ignition. Preparation for the burn may include line building, both by hand and machine.

**Pile Burning** - Pile burning disposes of hand or machine-piled slash. Piling the slash and burning during cooler, wetter, or winter conditions reduces the chance of escape and lessens the potential for damage to the remaining vegetation on site. Piles are normally ignited by hand using fuses or drip torches.

**Directional Felling.** Large, heavy fuels that create a fire ladder or carry crown fires can be manipulated both within and surrounding cultural resources to reduce the danger of fire damage.

Experienced professional loggers can fell large trees with high precision to avoid sensitive cultural resources (e.g., historic structures, prehistoric archaeological surface features).

**Helicopter Yarding or Logging.** Trees may be lifted from the ground by helicopter with little ground disturbance. This yarding technique is common for roadless areas and areas with sensitive resource concerns where traditional terrestrial yarding cannot be used. Helicopter yarding usually creates a small amount of ground disturbance where the trailing end of the log is dragged vertically before lifted off the ground. This dragging typically disturbs an area no more than one square meter and disturbs the ground to depths less than 20 cm.

**Full-suspension yarding.** Various full-suspension yarding techniques may be applied to remove trees with little or no damage to archaeological deposits. Logging equipment such as front end loaders and skidders with steel tracks or rubber tires may be used to carefully and fully lift logs and remove them from the site. Special care and monitoring is necessary to ensure that track or tires do not disturb surface soils.

**Low-impact Logging Equipment.** Other types of low-impact logging equipment may also be available for use on and surrounding cultural resources. One type of machine is the feller-buncher, which uses a hydraulic arm and grapple to grab trees, cut them below the grapple, lift and suspend them directly from the stump, and rotate to gently lay the tree in stacks (bunches). There are also cut-to-length logging machines that lays down a bed of protective slash in advance of the machine, which is designed for minimum ground impact. Once again care must be exercised to ensure that the vehicle, either tracked or tired, does not disturb the ground surface when they enter or exit archaeological sites.

**Over-the-Snow Logging.** Fuels may be safely reduced on archaeological sites in areas that receive relatively deep snowfall by removing trees over the snow. Typically, minimum snow depths and maximum temperatures are specified to ensure that the ground surface will not be impacted by logging equipment.

**Burn Prescriptions.** Non-exclusionary treatment measures may involve the use and manipulation of fire or fuels to attain certain temperatures, fire residence times, or other conditions (e.g., smoke limitations). Burn prescriptions may involve scheduling considerations to ensure certain fuel or air moisture; the reduction, if not elimination, of heavy fuels; application of water or other materials to keep fire temperatures within specified parameters; or applying certain firing techniques to manipulate fire residence time. Burn prescriptions should be designed and implemented by fire management specialists.

**Surface Collection.** Even severe fires rarely impart extensive damage to materials that are buried more than a few inches below the ground surface. Treatment of archaeological site surfaces may include the removal of cultural materials from the ground surface. Removal may involve mapping the location of artifacts, and could include temporarily collecting large artifacts prior to a fire and returning them once fire danger has passed. Alternatively, more extensive collection of fire-sensitive archaeological material (e.g., obsidian debitage) may be curated for future study, since returning such material to correct proveniences on site surfaces is impractical.

**Scheduling**. Scheduling a fire management activity during a season when certain critical cultural resources are less likely to be harmed is another potential treatment measure. For example, fuel management projects might be scheduled to avoid burning Native American plant resources during their productive periods. In other instances, fires may be scheduled to enhance Native American plant productivity.

## ATTACHMENT 4. FIRE MONITORING FORMS

FOR HERITAGE RESOURCES IN

WILDLAND AND PRESCRIBED FIRES

by

**Krista Deal**
Pacific Ranger District
Eldorado National Forest

These forms are modified from:

Deal, Krista
2001 Field Guide for Recording Fire Intensity, Fire Severity, and Fire Effects on Prehistoric Sites in the North-Central Sierras. Appendix D in Archaeological Investigations at Thirteen Sites within the Cleveland Fire, Pacific Ranger District, Eldorado National Forest. On file at the Supervisor's Office, Eldorado National Forest, Placerville, California.

## CULTURAL RESOURCE MONITORING FORM FOR PRESCRIBED BURNS

**SITE or Other ID NO.** _____ **PROJECT NAME:**_____

Land Managing Unit: _____ Date of Prescribed Burn:_____

Effects Recording Date: _____ Recorders' Names: _____

---

**PRE-BURN DATA**

Pre-fire vegetation: _____ Pre-fire fuel loading at _____tons/acre (estimated/known)

Describe fuel distribution/arrangement/continuity:

_____

If known, complete following*:* _____ air temp. fuel moisture: _____ 1 hr _____ 10 hr _____100hr

_____ surface fuel depth _____ soil moistures _____ duff moistures _____ duff depth

_____ wind spd/direction _____ relative humidity _____ pre-burn fuel load _____ post-born fuel load

Fuel Model Type: _____

Fire histories available for area (describe): _____ Current opportunities to secure fire history: Y / N

Evidence of prior burning (describe):

_____

Pre-fire obsidian hydration available: Y / N Other pre-fire data available: _____

Is cultural resource included in a: _____ Fire PA _____ Fire Management Plan _____ Burn Plan (attached: ___ no __ yes)

**FIRE BEHAVIOR AND INTENSITY**

Flame length: _____ (observed/estimated Flame length Class: _____

Average height of lethal crown scorching: _____ Average tree mortality diameter: _____

Evidence of rapid or unequal heating or cooling: _____ Rate of spread: _____(known/estimated)

Estimated fireline intensity: _____ BTU/foot/minute Total heat release: _____BTU/square foot

Amount and direction of smoke: _____ Fire residence time: _____known/estimated

Other: _____

**SEVERITY OF GROUND CHARRING**
*(indicate criterion used, i.e., Ryan and Noste 1983)*

Soil type/series: _____ _____ baked / hydrophobic soils

Local ground char severity: _____ uncharred _____ light char _____ moderate char _____ deep char

_____ ash color _____ depth of ash _____ depth of burnt-out stumpholes _____ root burnout

Areal average fire severity class: _____U (uncharred) _____L (light) _____M (moderate) _____ H (heavy)

Criterion used to assign above values: _____

## FIRE/THERMAL EFFECTS TO CULTURAL RESOURCES

**Impacts noted to: Site:** __ _____ **Feature:** _____ **Landscape:** _____ **other:** _____

Observations noted from surface contexts: Location: _____ / Subsurface: _____ depth/level in Unit: _____

**Observations made on: Artifact class:** _____ **Material type: :** _____ **Feature type: :** _____

*(Recording options: put check marks; actual count; % of total with effects; indicate with a "k" or "sus" if effects are known or suspected; or use designations MIN for minimal, MOD for moderate, or S for severe)*

Observations by: _____ unaided eye _____ low magnification _____ high magnification

_____ broken _____ fractured _____ spalled _____ shattered /exploded _____ potlidded

_____ crazed _____ exfoliated _____ crenulated _____ oxidized _____ bloated

_____ vitrified _____ melted

_____ internal change in luster _____ material unrecognizable _____ destroyed

_____ extreme vesiculation (____ frothy, _____ puffy, _____ styrofoam-like) _____ other: _____

*Surface*: _____ rainbow hue _____ metallic-like sheen _____ reddened _____ blackened _____ sooted
_____ dulled _____ smudged _____ discolored _____ patinated _____ crumpled
_____ bubbled/vesiculated _____ roughened _____ pitted
_____ retardant stained _____ other: _____
_____ residues/adhesions (____ shiny, ____ smooth, ____ tar-like, ____ brittle ____ baked,
____ other: _____)

*Other:* _____ burning into subsurface via ____ stump holes (depth: _____cm) ____ roots ____ other:
_____

_____ consumption of flammable cultural Elements _____ baked soils
_____ suspected altered protein residue _____ suspected altered hydration
_____ other dating techniques possibly affected:
_____

**Remarks:**

_____

_____

*Were Standard Treatment Protocols in use:* _____ No _____ Yes: _____ buffer zones _____ flagging
_____ fire breaks _____ back burning _____ fire retardant _____ fire shelter fabric
_____ directional felling _____ burial of surface fuels _____ hand removal of fuels _____contingency plans
_____ other: _____

*Were treatment protocols effective?*

_____

*Remarks:*

_____

*Attachments:*

_____

*(if resource impacted by an escaped burn, document impacts from suppression using the suppression impact form, and assess what long term vulnerabilities the resource may now have)*

**Post fire studies:** _____ hydration _____ protein residue _____ pollen _____ phytolyths _____ starches
_____ ochre / other pigments _____ other: _____

**Reported in:** _____

**Remarks:** _____

_____